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INDEX TO CONTENTS, PAGE 193. - - - - - - - - - ADVERTISERS' INDEX, PAGE 22.

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STEEL CONSTRUCTION

Pittsburgh

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THE UNITED GAS IMPROVEMENT COMPANY,

PHILADELPHIA.

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OF

AIR AND STEAM SUPPLY

(PATENTED),

AFFORDING { **PERFECT CONTROL OF GENERATOR FIRE CONDITIONS.**

PRODUCING { **UNIFORM RESULTS. HIGHEST EFFICIENCIES.**

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CONTENTS.

An Asterisk (*) Denotes an Illustrated Article.

Meeting of the North British Association of Gas Managers, by a "Special Correspondent".. 193
The Value of a Gas Coal for Use in Gas Works, by Mr. T. D. Miller..... 194
Address of the President (Mr. C. S. Vance), Twenty-first Meeting, Pacific Coast Gas Association..... 195
*Why the Gas Company Should Handle Gas Arc Lamps, by Mr. C. B. Babcock..... 198
*Recovery of By-Products in the Modern Coke Oven Plant..... 199

EDITORIALS—
Briefly Told..... 200

The Close of the Michigan Meeting—Pittsburgh Convention, Illuminating Engineering Society—Special Correspondence, The San Jose Meeting—Recent Installations, Dessau Verticals—General Gas Light Company's Victory in the Infringement Suit—Current Mention.

*The Brown High-Resistance, Electric Pyrometer..... 203

SPECIAL ENGLISH CORRESPONDENCE..... 204

Free Gas Appliances—A Household Refuse Destructor—Modern Gas Light in London Streets.

NEW METHODS AND APPLIANCES..... 205

*Historic Gavel for President, Illuminating Engineering Society—*Locating Leaks in Water Mains.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES..... 206

Personal—Mr. Humphry is all Right Again—A Grand Veteran—Our "Mory's" Ways—Good Results—Mr. Geo. M. Howsmon Joins the Wm. M. Crane Forces—Betterments at Oneida, N. Y.—New Stock Issue, Kokomo, Ind.—Buffalo (N. Y.) Proposed Main Extension Argument—Manager De Freese Gets 60 Per Cent. of His Claim—The La Grange (Ga.) Works to be Built—A Woful Waste—Uncovering a Petrified Forest—Mr. Brooks Goes to the Larkin Company—Mr. Hancock in Charge at North Adams, Mass.—Annual Meeting, Worcester, Mass.—Mr. Mr. F. M. Goodwin Represents the Profit Shareholders—The Revere (Mass.) Local Employees' Association—Contract for The Gas Machinery Company—Betterments at Elkton, Md.—A Peculiar Charter Feature—And Other Items.

The Market for Gas Securities..... 208
Meeting Times of the Various Gas Associations..... 208
Public Lighting Table for October, 1913 (Advertising Section)..... 10

Meeting of the North British Association of Gas Managers.

[By a "SPECIAL CORRESPONDENT."]

The members of the North British Association of Gas Managers held their annual meeting, September 14, in Greenock, Mr. James Macleod, Manager of Greenock Corporation Gas Works, the President, was in the chair. Bailie A. P. Smith welcomed the Association in name of the Corporation. Referring to Mr. Macleod, he said that, during the short time he had been with the Corporation, he had shown great abilities, and they anticipated greater things for him in the future. The Annual Report of the Council showed that the membership of the Association for the years 1912-13, was 251, and the finances were stated to be in a satisfactory state.

The President's Address consisted (in part) of an historical record of Greenock gas supply since the inception of the first works in 1828. These were, at the start, under the control of the Trustees of the Water Fund, in whom the right to light the town was vested; but in 1831 they were transferred to the Magistrates and Town Council. In the first year the numbers of consumers were 89, by meter, and 433 by contract; and in 1840 the numbers were 649 and 992, respectively. The number of contract users then rapidly declined, till (1850) they had practically ceased, and the consumers by meter had increased to 4,756. The number of consumers, June 30, 1913, was 16,201. At this date the interest-bearing debt of the department was a little over $1,000 per million cubic feet sold and accounted for, being the lowest in Scotland known to the speaker, indeed, five times that debt was not unknown. In his concluding remarks Mr. Macleod said that continued growth in output in recent years had led to consideration of the installation of vertical retorts. The increase in 1909, and practically for the three previous years, was 292,000,000 cubic feet; in 1910 (Mr. Macleod's first completed year as Manager), 300,000,000; in 1911, 317,000,000; in 1912, 363,000,000; and in 1913, 383,000,000. These increases amounted in all to 31 per cent., and as already the current year showed still further increase, there was reasonable prospect of continued advancement.

Mr. Ralph Halket, Commercial Superintendent of the Glasgow Gas Department, read a paper on "Notes on the Sale and Distribution Department." The keen competition of their electric friends, and the methods sometimes employed to belittle gas, had stirred in them a very wholesome spirit of progression. Manufacturers were assisting them by bringing science and skill to bear in the making of appliances, so that they now had articles to put upon the market that were thoroughly hygienic, economic, and labor saving. Gas undertakings had seen the advisability of opening up fitting departments and of keeping their own staffs of competent workmen, so that the work might be developed under their own care and control for the benefit of the industry and the welfare of the public. Municipal undertakings hesitated, fearing lest they prejudiced the business of local tradesmen; but he thought this fallacy was rapidly falling away. Instead of depriving a tradesman, by gaining their co-operation much business could be put in their way by the gas undertaking, and a good feeling be made to exist between the two. He suggested a scheme of training, more especially for the present day fitters, who were still young and ambitious of promotion, and he appreciated the educational value of a course o lectures for the employees of a gas undertaking. The dearth of really competent men for the outside department was a great present day evil. He regarded the showroom as a great asset to a gas undertaking. The use of it should be restricted to exhibiting and sale purposes, and, if the premises were sufficiently large, for demonstration purposes also; for if other duties were thrown upon the showroom the consumer was apt to be neglected to a certain degree. With regard to the ordinary household consumer and the tradesmen, the depths of these had been pretty well sounded by most gas undertakings. It had been proved to them that gas was by far the least harmful illuminant, and quite as efficient as any on the market, whilst being far more economical. They had also been shown that for heating purposes it was second to none, and that they could suit the shop as well as the home, and render them warm and comfortable and healthy. For cooking and domestic purposes also, notwithstanding keen rivalry, they had not yet been beaten, and had no immediate prospects of other methods being able to cope with them on even equal terms, whatever they might do in the faraway future. So far as light was concerned they were holding their own, while in the matter of heating they were somewhat restricted by the regulations of the Home Office; for in factories and workshops, where there is no open

chimney or vent, they had condemned the flueless gas heater, which efficiency met all the requirements of such premises. He thought it lay with the Association to place before the authorities the facts and tests in favor of those appliances, and persuade them to do justice not only to them in this matter, but also to the makers of the apparatus and to the consumers whose requirements they met. Gas power for industrial purposes was still a fertile avenue for their resources; but their backwardness in this respect might be attributed largely to lack of experience. It was a branch of industry that required specializing, and he was strongly in favor of keeping an official solely for this purpose. He felt also that the gas industry was on the brink of a great field of utility in gas furnaces. In Glasgow they were expecting to do a much larger business with this class of appliance, for which purposes they had set apart a room in their new workshops solely for them, to test, experiment, and demonstrate. The public were even yet scarcely alive to the number, variety, and utility of gas appliances. This could be best remedied by advertisement and demonstration. They wanted the public to be so familiar with gas that they would regard the house without a gas supply much as they would a house without a water supply, and the manufacturer to feel that his business was neither up to date nor efficiently equipped without the latest gas appliances.

Mr. J. B. Scott read a paper on the subject of developing the sale of gas and income tax depreciation. Fully a year ago representatives of the Inland Revenue authorities and the principal gas companies adopted a scheme of depreciation whereby a more reasonable allowance would be given in lieu of wear-and-tear, and make it much more easily arrived at between gas authorities and the assessor. For many years the Inland Revenue assessed for income tax at the source of production. That is to say, in the case of gas companies they assessed the company direct, not each individual shareholder. The reason why depreciation written off works and plant was not allowed was because it was paid out of the profits of the concern, and the same applied to any renewals or extensions that might have been paid out of revenue. With respect to deductions for wear-and-tear, it was left to the Commissioners to allow what they thought just and reasonable as representing the diminished value, and each set of commissioners had their own system fixed, and simply would not alter it. As to the new scheme, it was not an Act of Parliament, neither did it supplant any Finance Act, unless the gas company desired to adopt it and to be assessed under it; then the act was thrown aside and the scheme adopted as an alternative. It was only available for gas undertakings other than municipal, so that corporation gas works could not adopt it so far. For a progressive gas company, spending a lot of money on meters, stores, fires, services, and free gas fittings, and generally developing their business, he thought the scheme a splendid one. It certainly did not appeal in the same way to gas companies that were not developing on these lines, and possibly it might suit them to stick to the old way of assessment. Now that the method of arriving at the income tax valuation had been determined in a satisfactory way, one would wish to see the valuation of gas works under the Poor Law Act for rating purposes in the same position, and instead of three separate acts ruling England, Scotland and Ireland, as at present, one common law dominating the whole.

On the question of methods of developing sales, Mr. Scott said that the free slot installation was worthy of all the consideration they could give it, especially in towns and districts where large numbers of houses were still without gas fittings. He was also of opinion that if shop lighting was to be the success it ought to be, then it should be entirely in skilled hands. Many of the customers in his district were fond of the contract system, as it relieved them of the trouble and responsibility of attention, and in five years' time they could have another new lamp of the latest design without any payment of a capital sum.

Mr. David Vass, in a paper on "Free Gas Appliances," stated the general experience, that easier terms increased the popularity of the cooker and brought a return profit far in excess of the capital charge, had induced many undertakings to reduce that rental below a figure sufficient to cover the charges on capital outlay, and in not a few cases to abandon rental for cookers entirely. A concession was desirable, in that it aimed at inducing increased gas sales both by increased use of present apparatus and introduction of new business, which was justifiable, as long as it showed a profit in excess of the cost of introduction and maintenance. The system in use under Perth Corporation was to supply and fix all domestic gas apparatus free, under a guaranteed minimum consumption for each apparatus. The scale was 1,000 cubic feet for every $2.50 of net cost of apparatus and fixing—that is, for every $2.50 of capital outlay, the consumer was bound to pay a surcharge of 25 cents per 1,000 cubic feet for any quantity short of the guarantee. He admitted the advisability of a special rate for commercial and industrial purposes, and in Perth there was a very liberal scale for this class of business when measured by a separate meter. In the case of smaller supplies for industrial purposes, where it would not pay to introduce a separate meter, they could have the use of apparatus on the same terms as for domestic use, but only such apparatus as came within the list of domestic appliances as given out on these terms. Short discussions took place on the various papers.

Dr. W. B. Davidson delivered the "William Young Memorial Lecture," his subject being "Possible Economies in Gas Manufacture." Speaking of the various possible economies in candle power, fuel and purification, he said that, if these could be effected, the cost of coal gas ready for distribution should be reduced to 8 cents per 1,000 cubic feet, with coal and residuals at the prices already assumed, while if coal were $2.50 per ton the cost of the gas would be as low as 4 cents. The natural consequences of cheap gas were increased output, utilization of coal gas for heating the retorts, the municipal prohibition of the use of raw coal for domestic and other purposes, and the advent of smokelessness in towns.

The Value of a Gas Coal for Use in Gas Works.

[Prepared for the JOURNAL, by MR. T. D. MILLER.]

In considering the value of a gas coal for use in a gas plant, these things should be considered:

First: Its physical qualities. Hard and lumpy, or friable, and liable to slack in handling or storing; freedon from impurities, such as units of slate and iron pyrites. For hand charged retorts it has been customary to use lump coal screened over a ¾-inch mesh, or larger. Primarily this screening was to remove the mine slack which usually contained an excessive amount of impurities, and often dirt from the mines.

Second: Its chemical composition. It must have a proper percentage of volatile combustible, should be low in moisture and sulphur, and low enough in ash to produce a commercial grade of coke. A proximate analysis will not tell what the physical properties of the coke or the quality of the gas will be, for these can only be determined by actual carbonization of the coal; in fact, of two coals showing practically identical analyses, one may be well suited for gas making, the other not.

The calorific value of the coal, in conjunction with a proximate analysis, may give some idea as to the calorific value to be found in the volatile percentage; but, as a portion of this volatile combustible will be coal tar, which is high in calorific value, the B.T.U. of the coal is only an index of what might be expected in the gas. High volatile coals of high calorific value are more apt to produce high calorific gas than coals of lower calorific value.

The production of tar will usually be larger when the coal is carbonized at low temperature, within working limits, as compared with that produced from the same coal at higher temperature; and, as a rule, the quality of the tar will be better and the content of free carbon lower.

The sulphur content of the coal becomes a serious problem if it runs high, no matter how good a gas maker the coal may be. Should the crude gas contain a large percentage of organic sulphur compounds it may even be prohibitive, unless special treatment be resorted to, involving additional apparatus and expense. When the products from different coals are known, and the value of these products established by an available market, it is a simple matter to determine the comparative value of different coals.

A ton of high grade gas coal will produce in retort benches merchantable products (by weight) approximately as follows:

Content.	Weight.	Per Cent.
Coke	1,300 pounds	72.9
Coal tar, 13 gallons	130 "	7.1
Ammonia NH_3	9 "	0.3
Gas, 10,000 cubic feet	350 "	19.7
Total	1,785 "	10.00

These products, on the assumed selling price, are worth:

	Value.	Per Cent.
1,300 pounds coke, at $4 per ton	$2.60	19.4
13 gallons coal tar, at 8 cents	.39	2.9
5 pounds NH_3, at 6 cents	.40	3.0
10,000 cubic feet gas, at $1	10.00	74.7
	$13.39	100

Comparison Percentages.

	Weight.	Value.
Coke	72.9	19.4
Coal tar	7.1	2.9
NH_3	.3	3.0
Gas	19.7	74.7

Ratio Values.—Gas to coke 3-8; or, in even figures, 4 to 1.

The gas yield being four times the value of the coke yield, therefore, a coal that would give an increased yield of gas over another coal of 1 per cent. would be of equal value, if the coke yield from the coal were 4 per cent. less. If the yield of gas showed an increase of 5 per cent. and the coke yield showed a decrease of 4 per cent., it would still show the coal to be 4 per cent. more valuable, so far as total value of coke and gas were concerned, as a gas maker.

For a plant recovering its NH_3 in some form, the tar and ammonia bear a ratio nearer to 1, varying according to local prices for same, and should be considered accordingly. The value of ammonia products has shown decided advance in recent years, and coal tar has been in quite a steady demand, and it is believed that the demand for these two products is so well established that prices in the future will show but little, if any, decline from the present market.

The establishing of new business departments for gas companies has become practically universal, and these departments have given excellent service in promoting the use of gas consuming appliances; and while some attention has been given to the introduction of coke for general use, it is safe to say that, in the majority of instances, the proposition has been handled on the basis of getting rid of the coke. But the coke trade is destined to become even a more vital element of the gas business in the immediate future. There has been a shortage of coke for the general trade for several seasons past, and it seems general opinion that the steadily increasing demand for smokeless fuel, combined with a shortage in the anthracite supply, will tend to maintain the demand for coke to a satisfactory degree, even in the face of increased production. It, therefore, behooves the producer of coke to look well to the quality and preparation of his commodity, in order that he may not only maintain his hold on, but increase his trade, at the same time getting top market prices.

Entirely satisfactory results from the use of any fuel can only be obtained by adopting methods in handling best suited to it, and this applies to the promiscuous use of coke as much as to any other fuel. The good work done and being done in educating customers to the proper and economic use of gas shows what systematic effort will accomplish, and it is equally important that similar steps be taken with this very important and valuable by-product of the gas plant.

In plants where careful attention has been bestowed in this direction, the profitableness thereof has been clearly shown, not only in the price obtained for prepared coke but also in the creation of a practically all-year round demand for same. True, there is a loss in crushing coke of from 10 per cent. to 15 per cent. in breeze, still the value of the coke thus reduced to breeze, after deducting the value of the breeze and the loss thus sustained, will pay for the labor necessary to screen coke into three sizes; viz., nut, stove and furnace. The cost of a screening plant will be no more (perhaps less) than that of a crushing plant, with much less expenditure for power in operating. A trade on the sized coke can be built up to better advantage and better prices obtained than when offering the run-of-the-pile for all purposes.

Manufacturers are giving a great deal of attention to coke handling and screening devices, and much can be accomplished at mod erate cost in the way of installations of this character, thereby increasing the revenue and profit from the coke residual.

The larger the pieces of coke used in the furnace the smaller will be the surface exposed to the air, as compared to smaller coke in a fuel bed of the same area and depth. Accordingly, to produce a cer tain value of combustion with large coke will, therefore, require a greater depth of fuel than with small coke, so it would appear that small coke is better adapted to domestic use in the average fuel burning appliances. In fact one of the most prolific causes of complaint against the use of coke in ordinary stoves and heaters comes from lack of depth in the fuel box.

Everyone who has had to do with the sale or use of coke for domestic purposes has met with the objection that the draught is so difficult to regulate. The larger the pieces of coke the freer the access of the air; therefore, with the smaller (or nut) coke, more draught is required and can be utilized, consequently it may be more easily controlled.

The use of small or nut and stove size coke for domestic purposes is growing rapidly. Indeed in most places where it is being furnished it commands a premium. The small sizes, however, to give satisfactory results, should be equal in quality to the best lump coke. If nut coke is prepared, by simply screening the run of-the pile of coke made from coal containing its ash and sulphur bearing impurities in more or less large units, the nut coke is apt to contain more than its proportion of such impurities, producing an excessive amount of clinker, and it will run higher in ash than the lump coke. A coal that has its ash bearing constituents well and uniformly distributed throughout the body of the coal would, therefore, produce a more homogeneous coke, practically eliminating this defect. In order to produce a homogeneous coke the by-product plants grind their coal to a fine powder before carbonizing.

Such an ideal coal should, therefore, appeal to the coal gas maker, provided the coke structure and yield were satisfactory, the yield of gas and tar being ample, both as to quantity and quality. Should the coke from such a coal be of an unusually hard quality, and because of its hardness was predisposed to fracture in quenching so that it broke into 50 per cent. of stove and nut sizes, but at the same time produced even less fine breeze than a more friable but larger coke, it would be a more desirable article for the trade, in that it furnished a large quantity of perfect quality of the smaller sizes by simply screening, thus reducing (if not entirely eliminating) the crushing required in many plants.

If this coke showed an increase in the amount of fixed carbon, less ash and a consequent higher calorific value, the fact that the yield of coke was 2 per cent. less than the more friable coke should not be an objection, particularly so if it were found that the loss from fine breeze in the harder coke were 2 per cent. less that the softer coke. A coal of this ideal character, producing a coke of such value is found in the following analyses:

Content.	Coal.	Coke.
Yield, per cent		64.70
Moisture	1.65	1.29
Volatile matter	35.57	2.40
Fixed carbon	59.12	87.91
Ash	3.67	7.92
Sulphur	0.61	0.47
B.T.U.	14,545	13,694
Tar.		
Yield per ton, gallons		14.15
Per cent. free carbon		16.14
Ammonia.		
N H, pounds per ton		5.00
Gas.		
Cubic feet per pound		5.34
Candle power		15.25
B. T. U.'s per cubic feet		640.00

Address of the President (Mr. C. S. Vance, Los Angeles), Delivered on the Occasion of the Twenty-first Meeting, Pacific Coast Gas Association, San Jose, Cal., Sept. 16, 17 and 18.

Gentlemen: Owing to the death of Mr. Henry E. Adams, whom we elected to the office of President at the last convention, it devolved upon me to take up the reins of the Association, and to preside over the twenty-first annual convention, though it is with a feeling of deep regret that I do so under such sad circumstances.

We meet to-day in a typically prosperous, and rapidly developing, California city, a city famed for its beauty, and well deserving its title, "The Garden City." In the name of the Association, I thank the Chamber of Commerce and the citizens of San Jose for their hospitality.

The real worth of a meeting of this character lies in the report of what has been accomplished by the various committees during the past year, and in the different papers which are presented for consideration. Realizing this, and bearing in mind the fact that the technical and engineering branches of our industry will receive at-

tention in these papers, I will only briefly touch upon a few important matters vitally affecting the interests of our organization.

Gas Manufacture and Distribution.—During the past year there has been a very noticeable increase in the number of central stations for gas distribution, and the smaller companies have shown a tendency to either sell to or consolidate with larger concerns. This is of great benefit to the gas industry generally, as it tends to a betterment of service and a lower gas rate, and gives the consumer a superior and more even product. Again, it furthers the development of high pressure distribution, which is instrumental in supplying, not only the smaller country towns, but farms and ranches wherever the lines pass, which would not otherwise justify service for many years to come.

Development along purification lines seems to have been confined to efforts to eliminate naphthaline, the oil scrubber being adopted as the medium along the Pacific Coast.

The disposition of carbon, the principal by-product of oil gas manufacture, by means of mechanical separation and manufacture, into either briquets for domestic fuel or bricks for fuel use in plants, has, during the last year, been adopted by a number of gas companies on the Pacific Coast. The Los Angeles Gas and Electric Corporation is the pioneer in this branch of the gas industry, and it is pleasing to see others profiting by its experience. Last winter, the demand for commercial briquets in Los Angeles was beyond all expectation, and taxed to the utmost the capacity of our transportation department.

Regarding the gas generator there seems a tendency toward the installation of larger units. Much study has been given to the reduction of manual labor, to the end that the operator may devote his energies to more intelligent supervision of the generators, and this results in higher efficiency, both as regards oil consumption and maintenance of the generator in general.

There have been some experiments to make oil gas under pressure, under the same theoretical conditions as now exist, except the increasing of the pressure to 30 pounds. To date, as far as I know, nothing worthy of mention has been established, these experiments being yet in their infancy. However, as the principles involved are correct, later development may prove of great interest.

Natural Gas.—Great progress has been made in the natural gas industry in California during the past year. The Midway Gas Company has completed a gigantic enterprise which bids fair to effect a great change in the gas business in and around Los Angeles. From the natural gas fields in the Buena Vista Hills, Kern county to Los Angeles, a distance of about 120 miles, a 12-inch pipe line has been built, and huge compressors, to increase the carrying capacity of the line, are being installed. A number of gas wells have been completed and more are being drilled. As no papers are to be presented on natural gas, I think it might be well to say a few words regarding its use and the results obtained therefrom.

The Los Angeles Gas and Electric Corporation is now using natural gas as fuel under its boilers and for heating the oil gas generators, and finds it very satisfactory, especially in the latter capacity. Here it has proven an ideal fuel for obtaining what is known as "Surface combustion." This combustion, taking place above the firebox arches, further reduces the repair item to this portion of the generator. It has also been observed, in the use of natural gas for heating the generators, that it is possible to make a finer adjustment of heat, owing to the fact that the amount of blast can be properly regulated; this being possible because there is no smoke to contend with, as is the case when using fuel oil for heating. Further, it is easily possible to get a more even (or flexible) distribution of heat desired. The natural gas burner used in the generators is of the simplest construction, being nothing more than a 2-inch standard, wrought iron pipe, with an ordinary regulating gate valve. This is connected to the generator, in place of fuel oil burner, alongside of blast nozzle. This gas contains about 1,000 B.T.U. per cubic foot, according to recent tests, and a year's experience with this fuel should demonstrate its efficiency as compared with California crude oil.

Legislation.—Since the adoption (in 1911) of amendment to Section 23, Article XII., of the Constitution of the State of California, giving to the Railroad Commission certain powers of control over gas and electric companies and other utilities, there has been a growing sentiment in favor of the surrender to the Commission of the power of rate regulation expressly retained by municipalities of the State under the constitutional provision. Several cities have already held special elections for this purpose; notably, Palo Alto, Orange, Willits, Covina, Monterey, Salinas, Eagle Rock, Antioch, Ontario and Belvedere. Recognizing this condition, the Legislature, at its recent session, proposed, to the qualified electors of the State, a further amendment to this section of the constitution giving to the Railroad Commission additional power to regulate rates of such utilities in all municipalities throughout the State. This amendment is known as Assembly Constitutional Amendment, No. 62, and will come before the people at the next general election, or earlier, should a special election be held at which such propositions could be submitted.

International Gas Congress.—The invitation extended by our organization to the American Gas Institute, asking that body to attend the International Gas Congress, to be held in San Francisco in 1915, has been accepted, and the Institute has taken charge of the issuing of invitations to the other gas associations. Most of these invitations have been accepted, and delegates have been appointed to the Gas Congress Committee. In view of the fact that these Associations will meet in San Francisco as our guests, it is incumbent upon us to make their visit a memorable one; and, in order to accomplish this, it is absolutely necessary that all the members lend their support and co-operation to this enterprise. There is considerable work to be done between now and the time of this meeting, and it behooves us all to put our shoulders to the wheel and do our utmost toward making a success of the most important project ever started by this Association. Mr. E. C. Jones, our delegate to the Gas Congress Committee, will tell us in detail what has been accomplished by the Committee since our last meeting.

Gas Engineering Course.—It is indeed very gratifying to note the success which has met our efforts to establish a course leading to the Degree of Gas Engineer, University of California. During the past year, that Institution has made the degree part of its curriculum, and reports indicate that the students are taking a lively interest in this study. This work has been well begun, and it rests wholly with the members of the Association as to whether or not it will be pushed to a successful conclusion. I know that we will all be interested in hearing more about this great undertaking for which the Association is responsible, and the report from the Chairman of the Committee in charge will, no doubt, cover all the details.

Obituary.—Death visited our ranks five times during the past year and carried away the following members:

Henry E. Adams, Stockton, Cal.
Prof. T. S. C. Lowe, Pasadena, Cal.
Harry O. Byerly, San Jose, Cal.
James A. Keys, Suisun, Cal.
F. V. T. Lee, Victoria, B. C.

Memorials have been prepared by our Memorial Committee, and will be incorporated in our Proceedings as a testimonial of our respect and esteem for our departed brothers.

General.—Our other programmes have been open to criticism because of the fact that too many papers were presented and too little time given to discussion. We have agreed that the number of papers to be read should be held to a minimum, thus giving all of the members an opportunity to discuss them. The interchange of ideas brought about by such discussion cannot help be of educational benefit to us all. We hope everyone will take a personal interest in whatever questions may be brought before the convention.

In thanking those members who have put forth their energies to make this convention a success, by presenting papers on subjects of practical interest, I must say we are fortunate, indeed, in having selected men especially well-fitted for this work. I wish also to express my appreciation of the work done by the various committees, and to thank those members who have assisted in the work of the Association during the year. I hope this meeting will be a source of great benefit and pleasure to all.

Why the Gas Company Should Handle Gas Arc Lamps.

[Prepared by MR. C. B. BABCOCK (San Francisco), for the Twenty-first Meeting, Pacific Coast Gas Association.]

From the beginning of the gas industry, in fact, up to comparatively few years ago, the actual business of manufacturing and selling gas was not thoroughly understood by more than a small percentage of the men engaged therein. Wideawake and thriving communities, with a few thousand inhabitants, usually awoke to the fact that a gas plant would be a very good thing, and, after some investigation and much discussion, a few of the prominent and more public spirited citizens were induced to accept a free and unrestricted franchise for a long term of years, usually accompanied by a contract for lighting the streets, and therewith made the great venture.

There is no doubt that the most able and intelligent men in these communities became interested in the gas plant; but few, if any, arrived at any conception of the ultimate possibilities of the business. As we all know, the cost of the utility was much higher than the present average selling price; the business, being new, was naturally filled with anxieties and perplexities of many kinds for these pioneers in the new art, because of their lack of knowledge and the experience which begets confidence; the methods were so crude, and the losses so great, that only the high price received for the product enabled them to carry on the business at all.

With the growth of cities, and the consequent increase in demand, there was still practically no opposition, and the methods of business evolved along the lines of least resistance until the arrival in the field of its great competitor, electricity. We of the gas industry who are now, and always have been, vitally interested in its present and future, realize that the advent of electricity was the best thing that ever happened to us. It awoke the gas man from his long and comfortable slumber, and made him realize that, no matter how large the field for his product, it was of vital necessity that he advertise, give good service, organize a sales' department, and then give better "Service," realizing that "Service" is the keynote of continued success.

The gas business in many respects, one might say in every respect, is no different than any other manufacturing business. It is not only necessary to make the product, but we must find a continually increasing sale for it. In the old days all time with effort was spent in the operating end, believing that the business was bound to come, and that there was no necessity for making any serious effort to go out and obtain it. Happily this old, now obsolete, idea no longer obtains in the minds of present day gas plant owners and managers. When electricity began to make serious inroads upon the lighting business of the gas industry, the far-seeing men of the profession realized that, if the price of their commodity were lowered, it could be used to advantage for domestic and industrial purposes. This plan, if followed out, would eventually increase the volume of business and reduce the cost of operation, is now conceded by every good gas manager. So, between the sales' department and the engineering department, close relationship must actually exist, for with increased sales of the utility, the cost of operation is reduced and the accruing profits correspondingly increased.

For some few years back considerable talk and newspaper publicity were given to the idea of municipal ownership. This is usually brought about by lack of attention to complaints, which constitutes the most serious neglect of consumers by a public utility corporation; sometimes, the price per 1,000 cubic feet is inmeasurably high. The consumer not being well acquainted with the cost of production, and other expenses to be borne by the corporation, immediately jumps to the conclusion that he can arbitrarily set the price of the commodity.

These facts are set forth as leading up to my argument why a gas company should handle its own appliances, maintain a sales' organization, and put forth every intelligent effort towards increasing the sale of its product through the education of the consumer. When it becomes expedient to reduce the price of gas, the increased volume of business, together with the decreased cost per unit, should, and ordinarily will, take care that the net earnings show a satisfactory increase.

Although gas ranges and industrial fuel appliances are big revenue producers, the fact must not be overlooked that gas arc lighting is the very cream of the business. There is no other better method of advertising a gas company's commodity than the installation of arc lamps throughout a city. They are a splendid reminder to the consumer that gas is reliable as a necessity, and that gas lighting possesses an advertising advantage to the gas company which few other advertising propositions can equal; for, while it is advertising the product, the lamps are also bringing in revenue at the same time.

It is obvious that the overloading of the consumer is bound to result disastrously to all concerned. It piles up the gas company's investment out of all proportion to net revenue, makes dissatisfied consumers and holds up a splendid system of lighting to ridicule. A lamp giving a maximum of 800-candle power should never, under any circumstances, be hung closer than 5 feet between lamps. It is against all laws of illumination and good business, and spells certain disuse of many lamps in the installation. A good, healthy, regular business is far better than that obtained by sporadic efforts, or so-called "campaigns." Large volumes of real good business, lasting business, are not obtained by Wallingford methods.

Those companies who have been most successful in the handling of gas arc lamps, that have years of experience, watch the maintenance departments closely, keep a keen eye on commercial department methods, and continue a sane development of the business along conservative lines. Whether the corporation be straight gas, or a combined gas and electric plant, it is an indisputable fact that the sale of illuminating gas is profitable; and, contrary to the ideas of some managers, it has been proved that the increased sale of illuminating gas brought about added increase of electricity for lighting purposes.

Fig. 1.—Gas Arc, Outdoor Street Lighting, Portland, Ore.

Not long ago, the writer had the pleasure of an interview with the general manager of one of the large combination plants of the continent. He stated, positively, that the installation of several thousand gas arc lamps had given an added impetus to electricity for illuminating purposes, and greatly improved the standard of illumination. Continued effort is necessary along new business lines if benefits are to be lasting.

The gas company should handle its own appliances, in that it is more vitally interested in both the appliance and the consumer than a dealer could possibly be. The gas company, by handling its own appliances, is in a position to buy the best type on the market, and benefits thereby, since it is responsible to the consumer for the appliance installed.

The appliance dealer is forced, from purely economic reasons, to depend upon a large margin of profit to justify his existence as a business concern, whereas the public service corporation, not being dependant solely upon the profit in the appliance, is, therefore, able to sell it at a much closer margin and furnish skilled maintenance service of a high grade, thus directly increasing the sale of gas by leaving the consumer satisfied.

Why should a consumer or a prospective consumer be forced to make a contract for gas in one place and go to another for the appliance when the two must be used together? The public service company, to eliminate complaints which are a source of vast expense, will naturally be drawn to the best appliance on the market, whereas a dealer or appliance man is encourged, through greater margin of profit, to purchase a cheaper quality of goods, which, in the end, is bound to result in added complaints to the gas company.

With the idea always in mind that its function is to increase the volume of business, if the gas company control the appliance business, it then has in its hands the power to increase its volume more rapidly and substantially than as though it depended upon an outsider to handle the appliances upon which it depends for the sale of its product.

One of the largest corporations in the United States, has developed a policy covering the free rental of gas ranges and gas arc lamps, and claims that its experience proves that the plan pays. I merely mention this to show that the public service company's aim should not necessarily be to profit on the appliance; rather, should they look to increased volume of gas, the resultant decreased cost of operation and increased net revenue to the company.

Rental vs. Sale of Arc Lamps.—Under no circumstance should the gas company allow a dealer to handle its gas arc lamp business, and

gas companies have found, from long experience, that the best way to install arc lamps is on a rental and maintenance basis rather than on the sale plan.

(1.) It is unfair for the gas company to force the consumer to purchase an appliance which he does not understand and which depends for its efficiency upon the maintenance given it. If it were an appliance which automatically cleaned, adjusted and renewed itself, it would be a different proposition; but the nature of the appliance demands that it receive regular and skillful attention.

(2.) An arc lamp is only the means to an end—that is, the sale of gas—therefore, it is of the utmost importance that the lamp be installed on a basis which will enable the salesman to place the greatest number of lamps and retain the greatest volume of business. It has been found, by careful notation of comparative figures, that the ratio is as three to one in favor of the rental plan.

(3.) The consumer will hesitate a great deal longer about making a large investment in arc lamps, where he would consider with pleasure a proposition whereby he paid say 50 cents per arc per month, this amount covering maintenance, rental of lamps and interest on the investment.

(4.) The gas company should never allow an arc lamp to pass from its control. As long as the lamp is owned by the company it retains the right to dictate as to whether the lamp will hang *dark* or *light*. The rental of lamps gives the gas company a direct and accurate check on all arc lamps installed. It is an actual fact that, in places where arc lamps are installed on the sale plan, that the gas company inevitably loses track of the majority of these lamps, through disuse or abuse, the appliance ordinarily being cast aside at a comparatively early date.

(5.) Over 75 per cent. of the gas companies in the United States engaged in the arc lamp business install them on a rental basis. The largest handlers of gas arc lamps in the world (the Peoples' Gas Light and Coke Co. of Chicago) installs arc lamps on a rental basis, and absolutely refuses to sell them outright; for, invariably, when the appliance passes into the hands of the consumer, he doesn't give it proper attention and refuses the gas company maintenance.

(6.) No gas company that has ever adopted the rental plan ever receded or voiced its willingness to do so. On the other hand, those gas companies following the sales' plan are dissatisfied and eventually change to the rental policy.

(7.) It is an actual fact that the profits from an arc lamp rented, are immensely greater than on the sales plan.

(8.) You are selling "Service" not arc lamps. Without the gas the arc lamp is of no value.

(9.) The pilot light consumption on an arc lamp will pay the interest on the investment in the lamp.

(10.) The fact that the gas company is willing to rent an arc lamp proves the confidence of that company in this lighting appliance. In selling an arc lamp, a salesman is liable to overlook the real issue; that is, the sale of gas.

(11.) Complaints are eliminated to a great extent by the gas company retaining title and ownership to the lamp, inasmuch as, if they remain the property of the gas company, the corporation is more liable to look closer after its own property than it would after the property of another.

12.) It inevitably keeps out cheap, shoddy lamps, because no dealer will start a rental business when he knows the gas company controls the field.

(13.) As long as the gas company must assume the responsibility for the arc lamp, whether it is sold or rented, it is more to its benefit that it retain ownership of the lamp than allow it to fall into the hands of the consumer, who is only interested in the appliance so long as it gives him light.

(14.) An arc lamp should be handled just the same as any other equipment at the plant. For instance, on the installation of a new bench at the gas works, so much is charged off per year for depreciation and, at the end of a given time, the equipment has paid for itself and the utility company does not face a big investment in equipment which has served its purpose. It is entirely within reason to give an arc lamp a life of, say, 6 years, and certainly within that time it will more than pay for itself. One of the best known arc lamps on the market is practically indestructible, and only demands a few minor renewals from time to time.

(15.) Mr. Norton H. Humphrys,[1] a contributor on English gas affairs, and recognized as one of the greatest gas engineers in the world, long ago realized the advantage of the rental over the sale plan, and has not only vouched for this policy, but has continually preached it to gas men the world over. Certainly a man of his wide experience and knowledge of the gas industry would not recommend a policy which he was not certain was to the advantage of the business of which he is such a vital part. I beg leave to quote Mr. Humphrys' views on the rental of arc lamps: "The only really satisfactory plan, in our experience, is for the gas company to provide the lamps at a moderate annual charge, to include maintenance, and to retain the entire control. It means some outlay of capital, some care to avoid accumulating half-used and valueless stock, and some continual expense; but the result is well worth while. I know of no town where this department has been properly attended to, and where at the same time the general sales of gas are unsatisfactory or show a falling off. Some gas engineers frequently say that there is nothing like selling right out. It keeps down capital outlay, and the consumer is more likely to continue to use the lamps. This is quite right. He does continue to use them—till they get dirty and fail to give service. All is well so long as the lamps are new, but when they begin to wear, there is trouble. He expects them to be kept in efficient order long after they ought to have been scrapped, and a number of lamps in bad condition will spoil the whole show. This objection applies equally, whether the purchase is for cash-on-the-nail or by installments. I have also met with the objection that, with plain hiring, the consumer is apt to want to change at frequent intervals and to have the latest improvements. This matter cuts both ways. It involves additional expense and perhaps a larger scrap heap. But it is not to the interests of the gas industry, if a lot of old-fashioned, inferior lamps are maintained in use, especially in the face of competition. The money spent in providing the latest and best is not altogether money wasted. There is always the difficulty about undertaking the maintenance of lamps or anything else that belongs to the consumer, that he objects to the cost of a second new lot when the first is worn out. With plain rentals no disputes need arise, and there is nothing to disturb that harmony between seller and buyer that is such a necessary feature of present day successful business methods."

Single Units.—With the advent of electricity into the lighting field, it found the gas man practically unprepared to su ccessfully compete. At that time a gas arc lamp was unknown, and the gas man was forced through necessity to depend upon the old incandescent burner, or single mantle lamp. The first onslaughts of the electric men proved the impossibility of holding the ground with a single unit against their competitors' single unit of electricity.

Remember that the gas man at this time depended almost entirely upon his lighting business for revenue. After several years of this unequal competition, great loss of business, etc., the brightest men in the gas business realized that, in order to compete, they must have a larger unit of high efficiency. To a few progressive gas men in Michigan is due the credit of conceiving the idea of a gas arc lamp. They put it up to the man whose name to-day appears on thousands of gas arc lamps, and he finally succeeded in producing the first successful gas arc lamp. This was only some 12 or 13 years ago.

Gas men throughout the country, immediately recognizing its merit, began to install them in large numbers, much to the discomfiture of the electric men.

Let us pause for a moment to analyze this small unit proposition. The makers of single burner lamps, who have not succeeded in the more skilled work essential to the production of a successful gas arc lamp, have shrewdly attempted to drive commercial gas lighting back to the smaller unit stage with the idea in mind that it was the proper thing to compete with electricity. We all realize now that the electric man used the single unit for the simple reason that he had never succeeded in perfecting a large unit, therefore he made the best use of the means at his command. The electric people for years tried to make an efficient large unit. When they did not succeed they at once laid their hands to the task of grouping their small units into a compact form to make a high power lamp.

Why should the gas man place himself on the enemies' ground with a small unit, when the experience of every gas man has been that the gas arc lamp is the only successful method of commercially lighting large areas. The revenue from a small gas unit is very small, not exceeding from 3 to 5 feet per hour, while the cost of maintenance is almost as large as on a 3-burner gas arc lamp.

Undeniably there are some few places where a small unit performs efficient work; but, on the large scale, the proper appliance for the

1. For 25 years the JOURNAL's Special English correspondent.

gas man to push for commercial lighting is a gas arc lamp, and experience has proven this statement incontrovertible. These figures will doubtless be interesting to the gas man in considering the advisability of using single burners or arc lamps.

From tests made on a well known make of 3 burner, inverted arc lamp, we find that the consumption was 12.28 cubic feet of gas per hour; 3,720 lumens, and 302 lumens per cubic foot, whereas on a fixture containing 4-inverted, single burners, the consumption was 12.60 cubic feet of gas per hour, giving 2,151 lumens, and only 170 lumens per cubic foot. The tests made on the 3-burner, inverted arc lamp were made by the Electrical Testing Laboratories, New York city. The tests on the single burner type of lamp were made in the laboratory of the manufacturer of these lamps.

In the gas arc lamp there is only one pilot light to contend with, whereas with small units there are many, the chances of outage, of course, being greatly increased. It is an absolute fact that a customer will not long be patient with a system of lighting where the danger of pilots going out is always very great. Certainly a gas arc lamp of, say, 3 burners, consuming 12 to 13 feet of gas per hour, is a much better investment for the gas company than a small unit consuming only about 4 feet of gas, when the cost of maintenance on the two types is almost the same.

In Conclusion.—The product of the gas company is manufactured for the purpose of industrial and domestic fuel and gas lighting. There is no good business reason why a gas company should not push the sale of, we might say, all three of its products, if we consider each under separate heads. It is beyond question that the gas companies should consider more closely the relationship existing between themselves and the manufacturer of appliances. The latter are yearly spending thousands of dollars improving and increasing the efficiency of gas burning appliances, and as long as the gas company retains a vital interest in appliances, just so long will the product of the manufacturer continue to be bettered.

I sincerely believe that, if the day ever comes when the appliance end of the gas business is turned over to the dealer, that day brings the disintegration and cheapening of gas appliances. We must all realize that gas is valueless without the appliance and vice versa.

Every page of advertising issued by appliance manufacturers is of direct benefit to the gas company; and, remember this, while the appliance manufacturer makes one profit on the sale of his appliance, the gas company makes an hundred fold. The relationship between gas company and appliance manufacturer is so close that a hair breadth scarcely separates them.

The foremost men in the gas business do not claim or believe that the minimum price of gas has been reached. Throughout the country the tendency is to lower prices. Reductions will be made possible by increased consumption brought about by progressive methods and continually improving appliances, and they will, for the most part, come voluntarily and as rapidly as possible. In some cases the prices will be reduced by legislation; and, for the most part, unjustly.

Believing that the theory of the gas man is "The greatest output at the lowest price," all depending upon the volume of business rather than a large per cent. of profit, the gas company should at all times direct its efforts toward increasing the lighting, domestic and industrial business.

In conclusion I would say that, in no other field of the business, will the reward be so great as that accompanying the lighting of large areas such as stores, churches, halls, factories, pavillions, windows and street lighting.

Recovery of By-Products in the Modern Coke Oven Plant.[1]

The recovery of the by-products from the gases evolved in the coking process in a modern by-product coke oven plant is a very broad subject and I will try to confine myself as closely as possible to the points of main interest.

The gas as it leaves the ovens through the foul gas main is taken over to the by-product plant and there cooled; the tar extracted, naphthaline thrown down as far as possible, the ammonia is scrubbed out by passing through water towers or other apparatus; weak ammonia liquor is distilled, the ammonia passed into lead-lined saturators containing sulphuric acid, and sulphate of ammonia is formed; or the distilled ammonia is placed in tanks and shipped as strong ammonia liquor. This is an outline of the *old indirect process.*

1. Abstracted from a paper on "The Modern By-Product Coke Oven," by Mr. C. A Meissner.

In the direct recovery process the scrubbing of ammonia from the gas is avoided by passing the gas through the saturator after the tar is separated. In some of the so-called direct processes the tar is separated by cooling the gases, and in that case a portion of the ammonia is precipitated with the tar and must be distilled. There are at present four processes largely used for recovering by products—namely, the *indirect*, the *semi-direct*, the *direct*, and the *thiosulphate.*

The effect of the coking time upon the ammonia is a subject that has not been fully worked out. Apparently longer coking time increases the percentage of recovery of ammonia, and the loss of ammonia becomes greater as we decrease the coking time.

So far as our experience goes, we seem to have no material difference in our recovery percentage when running between 16½ and 20 hours coking time.

The same applies to the question of whether a hot top is likely to increase the loss of recoverable ammonia. The general impression is that the cooler top is the better in this respect. Points like these have to be carefully balanced, because from them arises the question which is more economical, to produce a good blast furnace coke or a larger by-product recovery.

In the direct process (Fig. 1) the gas coming from the ovens is air

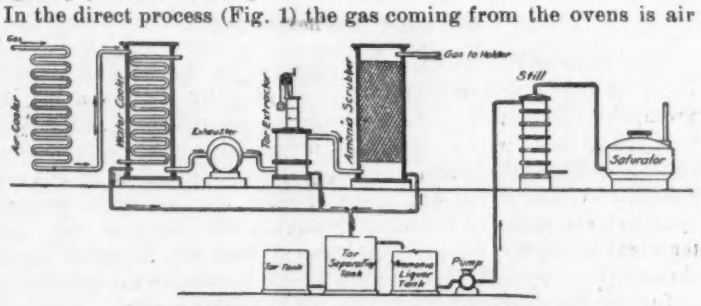

Fig. 1.—The Indirect Ammonium Sulphate Process.

and water cooled to allow the deposition of tar and combined ammonia liquor, and is then passed through scrubbers where the free ammonia is washed out with water. This weak ammonia water, together with the ammonia liquor separated from the tar, is then treated with steam and milk of lime in a still, and the ammonia vapors either pass into an acid saturator, or condensed into a strong ammonia liquor.

Koppers Semi-direct.—In the process (Fig. 2) the gas leaving the

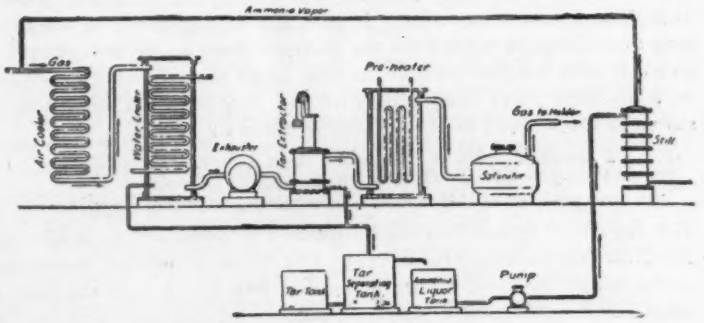

Fig. 2.—Koppers Direct Ammonium Sulphate Process.

ovens is first air and water cooled to a temperature of 104° F. This throws down most of the tar, the water vapor, the combined ammonia and some free ammonia.

The ammonia liquor is separated from the tar and treated in stills with steam and milk of lime in the usual way, the ammonia vapors being either converted into ammonia liquor or else returned to the system for conversion into sulphate by entering the gas main at a point prior to the water coolers, and traveling with the gas to the saturator.

The gas, after leaving the water coolers freed from most of the tar, passes through an exhauster to P. & A. extractors, where the remaining tar is removed. Thence the gas is returned to a heater where its temperature is raised to about 176° F., the heating medium being exhaust steam, or the uncooled gas from the ovens. The heated gas then passes into the saturator, where the ammonia is neutralized by sulphuric acid with the formation of ammonium sulphuric. Leaving the saturator at a temperature of about 120° F., the gas passes without further cooling to the gasholder for return to the ovens and its other uses.

In the Otto direct sulphate process (Fig. 3) the gas from the ovens is air-cooled to a temperature of about 200° F., and is then further cooled to about 160° F. by a tar spray.

(*Continued on page 202.*)

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BRIEFLY TOLD.

THE CLOSE OF THE MICHIGAN MEETING.—The closing day (the 19th inst.) of the Michigan session was marked by good weather and prompt business action. The first paper considered (that by Mr. B. O. Tippy) had to do with a reasonable presentation of some interesting statements anent the increasing cost of the prime factors in gas production. While it did not admit of close discussion, the remarks (particularly those by President Blauvelt, who resigned the Chair temporarily to Mr. Douglas, Mr. Dewey and Mr. Douglas) passed showed this very vital matter had a positive effect on the proposition to further lower selling rates for gas all the country over. The paper by Mr. A. G. Schroeder, on "The Practical Effects of the Michigan Workmen's Compensation Law," was then taken up. This gentleman is to be congratulated on the excellence of his work. It was a complete compendium of the standing and working effect of the measure, which, as Mr. Ernest F. Lloyd remarked subsequently (in a forceful written contribution to the discussion) was a topic worthy of close study and wide application. This ended the strictly technical sessions. The Assocciation, in consonance with the suggestion of the Committee, ordered that the meeting next year be held "aboard boat" *en route* somewhere. If suitable arrangement on such account could not be made then the sessions were to be brought off in Detroit, with the proviso that the time be so named as not to conflict with the State Fair. The report of the Nominating Committee resulted in the naming of the following officers:

President.—H. W. Douglas, Ann Arbor.
Vice-President.—Irwin Butterworth, Detroit.
Secy.-Treas.—Glenn R. Chamberlain, Grand Rapids.

The report of Committee on President's Address left no doubt that Mr. Blauvelt's thoughtful message had made a decided impression on the committeemen, which impression was also felt by the body at large. The invitation to have an official representative at the Gas Congress in San Francisco (1915) was accepted, and the choice of a special delegate was put over until 1914. Then followed the report of the Committee on Resolutions, and the tenor and ring of its sentences were the sentiments of all who shared in the meeting that it was in every respects an enjoyable success.

PITTSBURGH CONVENTION, ILLUMINATING ENGINEERING SOCIETY.—The seventh annual convention of the Illuminating Engineering Society was held in Pittsburgh, Pa., Monday to Thursday of last week, with an attendance greater than at any previous meeting. The total registration was more than 450, of whom about 200 were members of the Society. The address of President Preston S. Millar, and the report of the Committee on Progress, presented by Mr. F. N. Morton, were of exceptional interest, and the papers of more technical nature were of great value. From our standpoint, the representation of gas men was neither numerically proper, nor were there as many papers on gas subjects as there should have been if the gas fraternity really desired to hold up their end. They should take a very much greater interest and part in the work of the Illuminating Engineering Socity, or a very little less, and the latter would eliminate them entirely. We will tell the complete story in later issues.

SPECIAL CORRESPONDENCE, THE SAN JOSE MEETING.—"A. S. B.," writing from San Jose, under date of the 16th inst., says: Dear JOURNAL—The Twenty-first annual meeting of the Pacific Coast Gas Association opened here to-day with a large attendance of gas and gas appliance men. My first impression is that the unofficial meetings are much too scattered, owing to some misconception about hotel headquarters caused, it is rumored, by a misunderstanding about the intentions of the Hotel Vendome management, which gas men were led to believe wanted to act in a mothering kind of way, by making the meeting members register on the American plan. We, therefore, find members scattered over the city in hotels such as the Montgomery and the St. James, which are more modern and less dangerous, but not so stately and luxuriantly beautiful as the old Vendome, which is in the shade of sheltering palms, surrounded by flowers, and occupied by the majority of the fair members—nearly 50 in all—who have accompanied their husbands on this busines outing. Representatives are here from nearly every important gas city on the Pacific Coast territory, although comment is being made that, unfortunately, Mr. Papst, of Portland, has found it impossible to attend, this in view of the fact that there is a fight on between Portland, Ore., and Modesto, Cal., for the honor of entertaining the convention next year. The meeting assembled in Elks' Hall, at 10 A.M., promptly, Mr. C. S. Vance, of Los Angeles, being in the Chair, with Mr. Henry Bostwick, of San Francisco, acting as Secretary. The regular routine business was carried through expeditiously, and the loss, by death, of 5 members was officially reported. At this stage of the proceedings, Mr. John A. Britton, of San Francisco, made a eulogistic speech which for pathos and emotion was a masterpiece. He referred to the work of the deceased in glowing terms, and then went on to speak about the more personal characteristics of the departed members. Mr. Britton was so visibly affected that his speech seemed to end almost with a sob, and there were many indeed who were visibly touched by his flowing words, powerful oratory and personal eloquence. The touching references to the man more than the mechanic must have been very deeply felt by a descendant of one of the most illustrious who was present in the hall, Mr. L. P. Lowe, who ably did his part, as he has always done, in carrying on the great work which was so splendidly begun and continued by his worthy and able father. It is most unfortunate for members of the Association, and regretted by the entire gas profession, that the papers presented at these meetings are not printed and, therefore, have to be read in full by the authors. Take, for instance, the highly technical and maybe epoch marking paper, read to-day by Mr. Leon B. Jones, on "Oil Gas." It fairly bristled with technicalities, chemical equations, tables of results and original thought, and it was naturally a matter of impossibility for anybody, who then heard it for the first time, to attempt to discuss, commend or criticize the many important innovations suggested to the members and carried out more than experimentally at the Metropolitan works of the Pacific Gas and Electric Company. Who amongst your readers could, or would, enter into, on the spur of the moment, a discussion of the possibilities of producing synthetically, in a crude oil gas machine, marsh gas or methane. This was one of the claims made, and maybe not the most important one, by Mr. Jones for his new type of machine and novel method of operating same. In this gas generator Mr. Jones produces a calalytic atmosphere in the gas producing chamber, by passing through it purified gas, already made in it and stored in the holder. He claims that by forcing this gas, about 10 per cent. each run, through the machine just after the blow, and immediately before the run, he produces an ideal atmosphere for the formation of gas without undue deposits of lampblack. It is obvious members would have to study out the idea, and maybe try it practically, before being able to comment on it. He, and in the discussion, his able father, Mr. E. C. Jones, gave some very interesting information about the action of the oil spray, maintaining and seemingly proving that, in order to sustain the "oil-fog" or vapor, formed at the spray nozzle of the oil pipe, it is necessary to maintain the velocity of the oil vapor. This it is claimed cannot be done if the connecting pipe, between the nozzle and through the machine lining into the gas chamber, has an orifice greater than that in the nozzle or spray hole itself. Full details will be given in the paper when published, and I am only giving a hint as to what your readers may expect. The ladies are being well looked after, having automobiles placed at their disposal yesterday, enabling them to visit many parts of this Garden City. Despite the excessive heat—103° in the shade, the highest registered in any September for the last 8 years - a most enjoyable time is being spent. During the time the men are enjoying the banquet to-night, and listening to the speeches, the ladies will be entertained at the theater. There is a small, but interesting, display of gas appliances, open to the public, but it is hoped

the new committee will next year make a better showing possible. I cannot finish without referring to the splendid reception and wonderful, unforced hospitality offered to visitors. In this respect Westerners are in no way behind.

RECENT INSTALLATIONS, DESSAU VERTICALS.—The new installation of 6 benches of verticals, of the Dessau type, in the plant of the Providence (R. I.) Gas Company, is now in successful operation. This example, which represents the latest development of the Dessau retort, is designed with 15 retorts to the bench, arranged in 5 rows of 3 retorts each. Each 3 retort unit is charged and discharged simultaneously, the lower mounpiece, operating mechanism being actuated by hydraulic power. The foundations of the new retort house for the Pawtucket (R. I.) Gas Light Company are now completed, and active work on the construction of the retort benches (which are to be of the Glover-West system) will be started immediately. The expectation is that the benches will be completed early next January.

GENERAL GAS LIGHT COMPANY'S VICTORY IN THE INFRINGEMENT SUIT.—In the United States Court for the Western District of Michigan, Justice C. W. Sessions has handed down a decision dismissing, with cost upon the complainant, a suit for infringement brought by the American Gas Light Company against the General Gas Light Company. On February 16, 1912, the American Gas Light Company sent to the gas interests in general a very offensive notice informing the trade that the General Gas Light Company was infringing certain patents which the former owned, further stating that they had begun suit against the General Gas Light Company and had warned people against buying or using the latter's lamps because of the alleged infringement. This notice was set up and sent out in big type, and in so unfair way that the General Gas Light Company had every reason to believe it was done for the purpose of annoying it as well as its customers. The decision of the Court criticizes the complainants severely, declaring that their claims were founded on devices and improvement in arc lamps that were copied bodily from sketches and suggestions made by Mr. Humphrey, "its President and inventive genius," to one of his employees, who afterwards set up in business for himself and copied the Humphrey arc lamp. The text of the decision is a scathing rebuke to such piracy, and a deserved tribute to the real inventor, Mr. A. H. Humphrey, and to the General Gas Light Company as well.

CURRENT MENTION.—

THE School Board, Rockland, Mass., has ordered that the High School be equipped with the necessary kitchen outfit to demonstrate before the Class in Domestic Economy the value of the use of gas for kitchen work. In fact, we believe the equipment has virtually been installed.

"B. L. M.," writing from Lehighton., Pa., under date of the 23d inst., says: "The management of the New Parryville Consolidated Gas Company, of Parryville and Lehighton, Pa., has concluded a long-term lease with Mr. F. W. Rex, the prominent jeweler of Lehighton, under which he will erect for the Company a modern store and office building adjoining the Rex residence on North First street. The structure will have a frontage of 25 feet and a depth of 50 feet. It is to be of brick and concrete, and the front of the store will be entirely of plate glass. When completed it will be a decided addition to the business structures of the city, and of great advertising value to the New Parryville Gas Company, the proprietors of which are men right-up-to-date in every respect."

MR. HENRY I. LEA, as "Statistical Expert" for the Lincoln (Neb.) Gas Company, in the rate controversy now underway (and for a long time back also underway) between the authorities and the Company, had a rather spirited contest with the City's Attorneys over matters-of-fact connected with gas manufacture and distribution. It is needless to say that H. I. L. had all the best of the argument. Indeed, the attorneys got quite overheated as Mr. Lea uncovered their ignorance of the subject in hand—just like spent oxide overheats, when sometimes injudiciously exposed, so-to-speak.

"BARBOUR," writing from Pueblo, Col., under date of the 19th inst., says: "I note your short reference to the formation of a company, to construct, at Rocky Ford, Cal., a gas plant, the franchise for which has been granted to the Rocky Mountain Gas Company. The proposed franchise provides that the gas rate shall *never* exceed $1.40 per 1,000 cubic feet, and the petitioners are to file a bond (in respect of the special election to be held concerning the proposition) guaranteeing the costs of submitting the matter to the voters; again, it is agreed that the plant shall be completed and supplying gas to consumers not later than March 11, 1915.

THE amended schedule of gas rates proposed by the proprietors of the Vicksburg (Miss.) Company, is as follows:

Quantities, Cubic Feet.	Rate.
First 1,000	$1.50
Next 2,000	1.45
Next 2,000	1.40
Next 2,000	1.35
Next 3,000	1.30

All over 10,000 cubic feet, not to exceed $1.30 per 1,000. Prompt payment (within 10 days), entitles the user to a discount of 10 cents per 1,000. The minimum monthly bill is 35 cents; and the valuing of the gas is hereafter to be rated on a thermal basis (600, gross), instead of an illuminating basis, as heretofore.

THERE is positive indication that the gas stove and appliance makers, of the Middle-West especially, are to have large representation on the floor of the Manufacturers' Permanent Exhibit Building, Cincinnati, O.

MESSRS. H. W. URQUHART, (formerly Sheriff of Lewis County, Wash.), of Chehalis, Wash., and Jno. Stewart, of Seattle, have applied (through their attorney, Mr. Chas. F. Fuqua), to the City Council, of Raymond, Wash., for the right to there construct and operate a gas plant. It is estimated that the cost of the generating and distributing systems will be close to $75,000, and the applicants state that if the permission is given the plant will be constructed forthwith.

MR. VINCENT ELBERT, General Manager of the St. Joseph (Mo.) Gas Company, has been advised by Mr. A. B. McBeth, of Independence, Kas., General Manager of the Kansas Natural Gas Company, that the supplying of natural gas to the manufacturers of St. Joseph will be discontinued by October 15th. This is done so the users on domestic fuel account may depend on an ample supply on such account. Possibly Mr. Elbert's Directors will shortly see their way clear towards convincing the manufacturers that, for many of their purposes, artificial gas could be economically used; this, too, even if Mr. Elbert's folks had to construct a new plant.

MR. ARTHUR J. SMITH, for some time Manager of the Citizens Gas Company, McCook, Neb., has been appointed Manager of the City of Dell Rapids (S. D.) Gas and Water Company.

IN the splendid document, submitted to the shareholders of the Baltimore Consolidated Gas, Electric Light and Power Company, detailing the Company's operations for the twelvemonth ended June 30th last, it is shown that gas sales increased 6.9 per cent., as against a gain of 20.4 per cent. on electric current account; the gross earnings showed an increase of 11.9 per cent., and the net an increase of 11.6 per cent. That the percentage discrepancy (from a money point of view, as between receipts for gas and for electricity) is more apparent than real would seem proved from the fact that the gross on gas account was $3,260,966, as compared with $3,049,446 from electricity. During the year the main system was lengthened by the placing of 20 miles, bringing the total to 696 miles; 4,482 feet of new services were hooked up; 9,581 additional gas ranges were installed; and 2,734 new meter heaters were set-up. The report also recites the extensions made on the Spring Garden gas plant—which is now quite a model one—refers to the reduction in gas rates, and mentions the financing of the corporation, which was no slight task in the times of depression when the negotiations were being conducted. The complete affair shows the cleverness with which the great corporation is conducted, and President J. E. Aldred is to be congratulated on the ways and ability of his staff, both as to *entourage* and *personnel*. In fact, it is seldom that a better spirit of the body is shown in any corporation, in so far as their active working is concerned; and this is especially so of the various engineering inter-relations of the best managed corporation in beautiful, historic Baltimore.

WRITE to the Joseph Dixon Crucible Company, Jersey City, N. J., and inquire from them as to the opinion of Mr. Fred. Heckler, Supt. Lake Shore Electric Railway Company, Fremont, Ohio, respecting the value and usefulness of the Dixon Company's No 2 Graphite Cup Grease.

ON October 6th Truman W. Weitkuscht, F. C. Wickolay and O. E. Wasser, will apply to the Pennsylvania State authorities for the right to manufacture and supply, for fuel purposes, in the townships of Hanover and Salisbury, the borough of Fountain Hill, and in that part of the borough of Bethlehem lying within Lehigh County, Pa. The corporation is to be known as the Salisbury-Hanover Gas Company.

(Continued from page 199.)

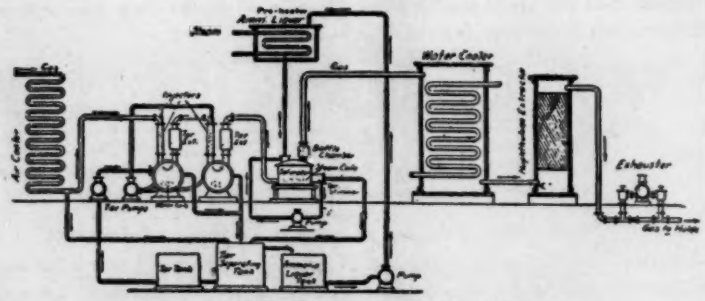


Fig. 3.—Otto Direct Ammonium Sulphate Process.

The object of cooling to about the dewpoint of steam is to prevent the deposition of ammonia liquor, which would occur if cooled to a lower temperature, and necessitate the use of stills as in the other processes. By keeping the temperature a little above the dewpoint this ammonia remains as vapor in the gas. However, some ammonia is invariably thrown down with the tar.

The spraying with tar is done in a two-compartment tar tank in series, so the gas is twice sprayed. The temperature of the spraying tar is kept at the right degree by means of water-cooling pipes in the tank.

The surplus tar washed out of the gas overflows into a regular separating tank, where the ammonia liquor that has come down with the tar is removed. The amount of this liquor is small. The tar-washed gas then passes through a stationary bell similar in function to a P. & A. tar extractor, where the last of the tar is supposed to be removed, but on account of the high temperature of the gas some tar remains. The gas then passes through a covered gas main to the saturators, where neutralization of the ammonia occurs with the formation of ammonium sulphate. Because of the imperfect separation of the tar from the gases, some tar is deposited in the saturators; therefore, it is equipped with a lead dam and siphon to allow the top portion of the mother liquor to be withdrawn into an open top tank in which the tar is skimmed off and the mother liquor returned. On account of the gas entering the saturator being fairly well saturated with water vapor, which, if deposited here, would weaken the acid bath and prevent proper absorption of the ammonia, the saturators are equipped with steam coils of lead, and the bath is kept at a temperature high enough to insure the retention of the water vapor in the gas. The ammonia liquor separated from the tar is heated by steam coils in a small tank, and is then introduced direct into the saturator. After leaving the saturators, the gas enters a tank containing brick baffles to allow separation of the acid, and thence to horizontal tubular water-coolers, to condense the water and as much naphthaline as possible.

Temperatures taken in a representative plant at the various stages of the operation were as follows:

Entering Koerting injectors	200° F.
After spraying with tar	162° F.
Entering saturator	160° F.
Leaving saturator	185° F.
Entering water coolers	171° F.
Leaving water coolers	102° F.

Collin Semi-Direct.—In the process (Fig. 4) the gas from the ovens

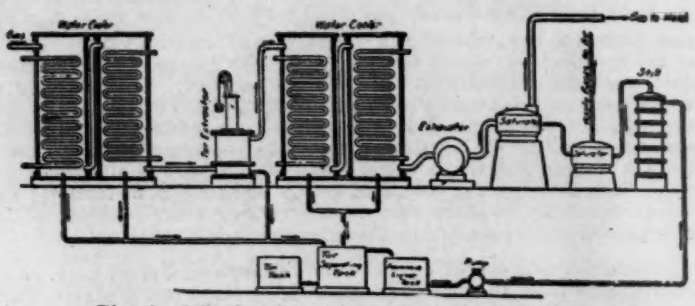


Fig. 4.—Collin Semi-Direct Ammonium Sulphate Process.

passes through the usual water-coolers where most of the tar and combined ammonia are separated, then through a P. & A. tar extractor. The cleaned gas then passes through another set of water-coolers similar to the first set, and then through the exhausters to the saturator. Two saturators in series are used in this process.

The cleaned gas enters the upper saturator, the bath of which is kept at about 25 per cent. free acid, and the liquor from this bath is used as the saturating medium in the second or lower saturator, into

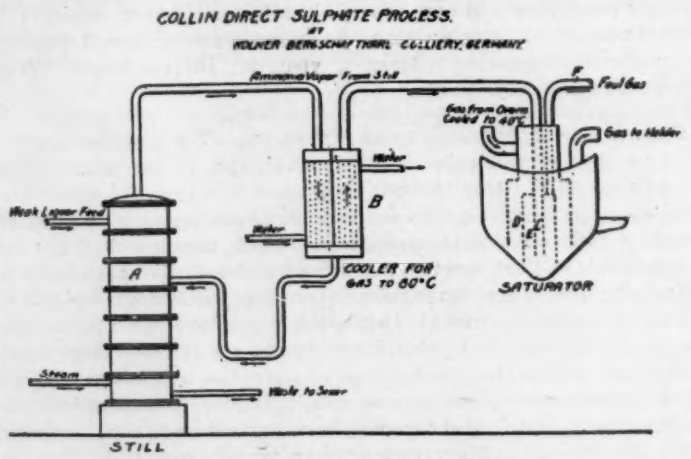


Fig. 5.—Collin Direct Sulphate Process.

which pass the ammonia vapors from the stills which are used as in the Koppers process.

One advantage claimed for this system of two saturators, one for the direct gas and the other for the still vapors, is that the "stink" gases (H_2S CN, etc.) from the latter, are at once eliminated from the system, escaping from the second saturator into the air and not coming into contact with the gas.

The temperatures at one plant where this process is in operation were as follows:

Gas entering first set of water-coolers	212° F.
Gas entering the P. & A. tar extractor	113° F.
Gas leaving second set of water-coolers	73° F.
Gas entering saturator	77° F.
Gas leaving saturator	100° F.

Experiments for a modification of this process are being conducted along the following lines:

The gas from the ovens will be treated in one set of horizontal coolers, P. & A. tar extractors, and another of horizontal coolers as above described. In the first cooler, however, ammonia liquor will be used for cooling instead of water. The liquor will thus be heated to about 194° F. in its action of cooling the hot gases from the ovens. This preheated liquor, and any vapor evolved, will be run to a superheater and brought to a temperature of about 300° F., which is considered sufficient to decompose the compounds of ammonia (chloride, carbonate, etc.).

The ammonia vapor evolved passes from here directly to the saturator. The superheater will be heated either by combustion of surplus gas from the ovens, or by utilizing the waste heat from the chimney flues.

Feld Direct.—In the process (Fig. 6) the sulphur in the gas is util-

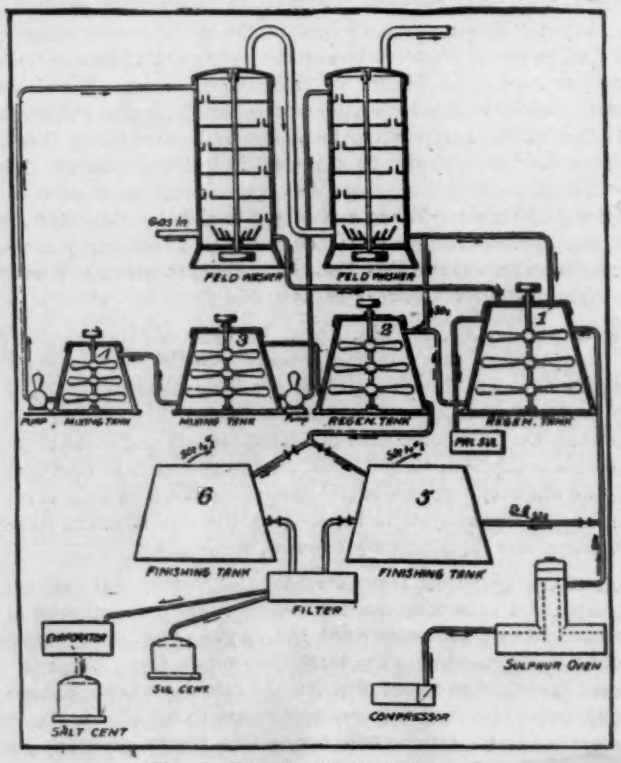


Fig. 6.—Feld Direct Sulphate Process.

ized to produce most of the sulphuric acid required for the neutralization of the ammonia. After leaving the ovens, the gases pass through the usual coolers, exhausters and tar extractors, and are then washed with a solution of ammonium polythionate, which absorbs the ammonia, forming ammonium thiosulphate and precipitating sulphur according to this reaction:

$$(NH_4)_2S_4O_6 + 2NH_3 + H_2S = 2(NH_4)_2S_2O_3 + S.$$

This mixed solution and precipitate are treated, in a tank provided with mechanical stirrers, with sulphur dioxide formed by burning in a suitable oven some of the sulphur previously precipitated; the thiosulphate is thereby regenerated to ammonium polythionate, according to the following reaction, and the precipitated sulphur is removed:

$$2(HN_4)_2S_2O_3 + 3SO_2 + S = 2(NH_4)_2S_4O_6S.$$

When the oxidation is complete, the solution of polythionate is heated to a temperature of 60° to 70° C. until all the ammonium polythionate is decomposed into ammonium sulphate, sulphur dioxide, and sulphur. The sulphur dioxide is used for further regeneration, the sulphur is filtered off, and the solution of ammonium sulphate is evaporated until the salt crystallizes out:

$$(NH_4)_2S_4O_6 + \text{Heat} = (NH_4)_2SO_4 + SO_2 + 2S.$$

Benzol (a colorless, inflammable, liquid compound having the chemical formula C_6H_6) is recovered from coke oven gases by scrubbing them with light oil, after the ammonia has been separated; that is, after the gases leave the ammonia scrubbers in the indirect process, or after the gases issue from the saturator in the direct process. Some benzol is also precipitated with the tar. The oil used for scrubbing is usually of specific gravity about 0.8; it should not be too thin, in which case long enough contact with the gas is not obtained, nor too thick, in which case there is a tendency to solidify.

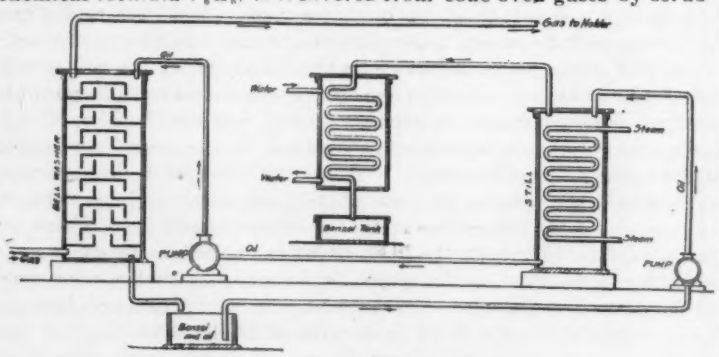


Fig. 7.—Apparatus for Recovery of Benzol.

After scrubbing, the mixture of washing oil and benzol is conveyed to a still, where the benzol is driven off by steam. The distillate so obtained is designated as crude benzol and contains about 50 per cent. benzol. This is either shipped as such, or purified by further distillation, fractionally distilled with separation of toluol and xylol. The oil for scrubbing is used over and over again until it becomes thick by accumulations of naphthaline and tar.

The yield of benzol depends largely on the volatile contents of the coal; usually the higher the volatile matter the higher the yield of benzol.

The Brown High-Resistance, Electric Pyrometer.

For measuring the higher temperatures no other form of pyrometer is as satisfactory or as accurate as the thermo-electric pyrometer, which, as is generally known, consists of a milli-voltmeter graduated in degrees of temperature connected to a thermo-couple. The desirability of having the resistance of the milli-voltmeters comparatively high has been a recognized fact; but it was not until recently that the makers of instruments were able to overcome the various difficulties of design and construction and produce such milli-voltmeter. For this reason low resistance, thermo-electric pyrometers have been generally used, the resistance of the milli-voltmeters measuring from 2 to 5 ohms. With this type of instrument it is absolutely essential that it should be calibrated with the leads or connecting wires which are to be used, and any change in the length of these leads, or any change in the length of the thermo couple furnished with the instrument, will alter the true indication of the pyrometer and serious errors will result. A change in the length of leads of 1 to 50 feet is sufficient to make the average low resistance pyrometer read 25° or more low, and a change in the length of thermo-couple from 3 feet to 4 feet will make the same instrument show 20° or more in error. For fairly accurate results, therefore, it is necessary to use the thermo-couple and leads which are furnished with the instrumennt, or exact duplicates thereof.

It is true that for some time galvanometers or milli-voltmeters, portable inform only and not of the switchboard or wall pattern of high resistance, have been produced abroad. These instruments are usually of the suspension type; that is the moving element is suspended from the end of a fine wire or metal strip. Aside from supporting the moving element the suspension strip has another function, and that is to restore the moving coil or element to its zero position. It, therefore, has to be comparatively long and also small in cross-section, otherwise the torsional resistance, or twisting moment, would be too great, and the high resistance characteristic would not be achieved. The result is that this type of instrument is very delicate, the suspension being easily broken. It is also necessary before using the instrument to carefully level it, as otherwise the coil will not swing freely in the magnetic field between the core and pole pieces. This type has, therefore, been unsuitable for general commercial conditions.

The advantages of a properly designed and constructed milli-voltmeter of high resistance are very marked, some of them being as follows: A change in the length of leads, connecting the thermo-couple with the milli-voltmeter, from 1 to 1,000 feet, will not change the indications of the instrument as much as 5°; nor will any change in the temperature of these leads introduce any error in the indications of the instrument. Neither will the length of the thermo-couple, the size of the elements forming the thermo-couple nor the length of thermo-couple inserted in the heat, change the indications of the instrument. These advantages are due entirely to the extremely high ratio of the resistance of the milli voltmeter as compared with the resistance of the thermo-couple and leads.

The Brown Instrument Company has for the past two years been conducting exhaustive tests and experiments in order to design accurate, high resistance thermo-electric pyrometers. As a result it is now able to supply an instrument of the pivoted type, in which the moving element or coil is not suspended from the end of wire or metal strip, but is supported by hardened steel pivots in sapphire bearings. The moving coil and pole pieces of the magnet have been so changed in design that they produce a magnetic flux of great intensity in the air-gap in which the coil swings. This instrument, with a resistance of 100 ohms, can be furnished in either the indicating type or the recording type.

Fig. 1 shows the standard type of indicating instrument of the high resistance type, it being customary to supply this instrument in the horizontal pattern as it thus affords a long scale for easy reading. This instrument has a mirror under the scale so that absolute accuracy in readings can be secured.

Fig. 2 shows the interior construction of the high resistance system, illustrating the redesigned pole pieces and small moving element, the latter having been lightened to a minimum. It will be understood that all the complaints heretofore experienced in pyrometers, due to the question of accuracy with a certain length of leads, or in the length of thermo-couple, or to the length of thermo-couple

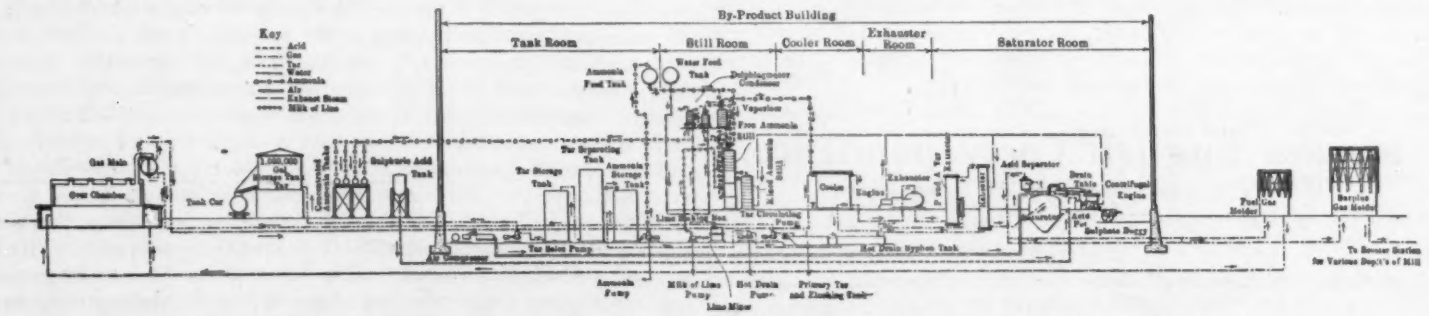


Fig. 8.—Diagrammatic Sketch of Flow of Gases, Extraction of Various By-Products, Etc., in a By-Product Coke Oven Plant.

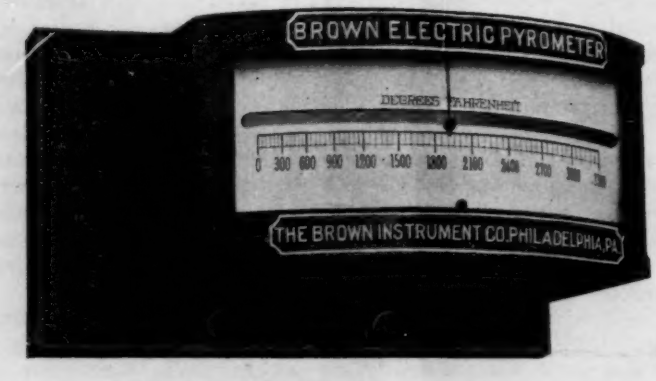

BROWN ELECTRIC PYROMETER
DEGREES FAHRENHEIT
0 300 600 900 1200 1500 1800 2100 2400 2700 3000 3300
THE BROWN INSTRUMENT CO. PHILADELPHIA, PA

Fig. 1.

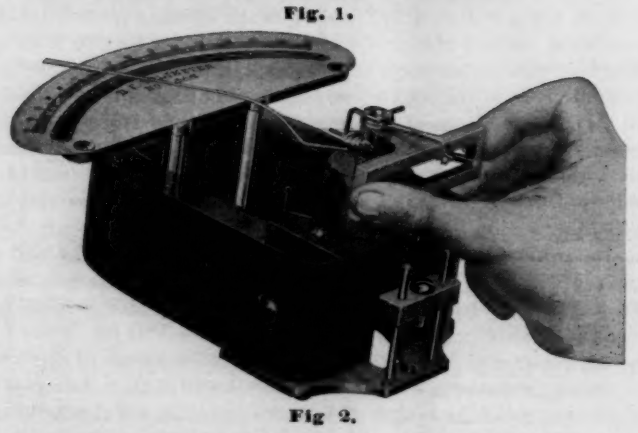


Fig 2.

inserted in the heat, need not be considered with this new instrument. Its accuracy is naturally far greater, and wherever accurate measurements are desired an instrument of this type will be used in the future.

The Brown Instrument Company has been able to design this system in such a manner that its cost is practically no greater than the cost of manufacturing the low resistance instrument, which permits it to put an instrument of this character on the market at a reasonable price. The instrument can be used for either base metal or platinum thermo-couples as desired, and it is recommended for either type of couple. The same type of system is also used in connection with the recording instrument, and it is possible now to procure Brown high resistance indicating or recording pyrometers, for either platinum or base metal thermo-couples.

Special English Correspondence.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, ENGLAND, September 10, 1913.

Free Gas Appliances.—A Household Refuse Destructor.—Modern Gas Light in London Streets.

The usual practice in England, with regard to gas consuming appliances provided by gas companies for consumers, is to supply on hire, if preferred, at a moderate but remunerative quarterly rental, the company accepting all responsibility for keeping the apparatus in repair. This applies to customers using ordinary meters. With the slot meters a loading of 10d. or 1s. per 1,000 cubic feet is added to the selling price of the gas. On previous occasions I have dealt with the reasons why the system of simple hire is found preferable to any hire purchase or payment by instalment system. But in Scotland the quarterly rental does not appear so popular, probably because the canny Scot likes to see something tangible for every penny of his outlay, and sometimes it may happen that the gas cooker or the gas fire is out of use for a month or two, but the rent, like Tennyson's brook, goes on for ever. Probably no system of charging is free from defects. However carefully worked out, there is always somebody on the wrong side of the fence. And so it is well to consider any alternative plan, and, therefore, attention is directed to a paper by Mr. David Vass, of Perth, read at a recent meeting of the North British Association of Gas Managers, and entitled "Free Gas Appliances."

Some years ago, while wandering about the gay city of Paris in company with one or two friends—one was a Scotchman—we passed a place of entertainment bearing the seductive announcement "free admission," and as we wanted a rest, we went in and sat down. Almost immediately the waiter came round and asked what we would take to drink. For a charge of a franc each we received tiny cups containing about a tablespoonful of coffee. Within some 15 minutes the waiter was round again looking for a second order. Mr. Vass has a somewhat similar plan. He offers a very liberal assortment of appliances, all fixed free. The customer may have a cooker (a boiling ring, or a griller, as an alternative), a hot plate, a scone baking plate, a gas iron, a wash boiler, a water heater, a geyser, and a choice of gas fires and radiators. But he has to guarantee a consumption of 1,000 cubic feet of gas per annum on every 10s. in capital outlay, or a surcharge of 1s. for every 10,000 cubic feet shortage. For £5 worth of apparatus he would have to guarantee 10,000 cubic feet of gas per annum, and if he only used 4,000 would have to pay a surcharge of 6s. The special feature is that, subject to a minimum consumption, the rent is returned to the consumer in the form of a rebate on the price of gas. And the point to be considered is whether this plan affords a substantial inducement, not only to prospective consumers, but also to existing ones, the second consideration being more important than the first. The average consumption per meter, or per service, is a prominent factor in the establishment of an efficient and at the same time cheap service, and any scheme that increases it is a benefit to all parties concerned. Any plan that offers an inducement to exceed any specified quantity has the practical advantage that the consumer, in order to make sure of the minimum, goes in for anything up to 200 per cent. If the minimun is 10,000 cubic feet per annum the chances are that he will run into 15,000 or 20,000.

But the plan has a disadvantage common to the usual slot meter agreements, and to any system whereby the charge for appliances is shifted on to the price of gas, and that is the carrying of an expense special to the consumer by which he alone benefits, and which he alone ought to bear, into the general funds, where all the consumers share it. To make the point clear, let us suppose that a consumer (A) has a liberal assortment of fitments, say £20 worth, and that he barely exceeds the minimum consumption of 40,000 cubic feet per annum. His next door neighbor (B) puts in, at his own expense, a large gas engine, or other appliance not on the free list, and uses perhaps 200,000 cubic feet per annum, paying the same rate per 1,000 as the man who has been fitted up free. A third party (C) in the same street also has £20 worth of stuff on hire, but uses 200,000 cubic feet of gas per annum, also paying the same rate. It is evident that C, paying the same price of gas as A, and incidentally the same loading per 1,000 cubic feet to cover the outlay on free appliances, pays five times as much as A for exactly similar service, while B also pays the same as C, but gets nothing in the way of a return. The 10 per cent. minimum barely represents incidentals and renewals. Some of the appliances have not a working life exceeding 10 years, and in practice a large staff must be kept for inspecting and attending to slight complaints. The result is that A pays nothing towards the dividend for the shareholders, and that customers such as B and C have to pay for A. So far we have assumed that A, B and C are using ordinary meters. But to some extent the position is the same with the slot consumers. Each slot customer is provided with the regulation stock of fitments, perhaps £5 worth. And as he pays a fixed loading per 1,000 cubic feet of gas as rent for the same, his payments vary exactly as his consumption. If B uses twice as much gas as A he pays twice as much for the same service. And B is just the class of consumer that gas companies want. They do not get a dividend out of the minimum consumer. The point that appeals to the gas manager is whether the Perth scheme will have the effect in practice of increasing the number of C class consumers, not only from outside sources, but at the expense of class A. It may at once be conceded that no company enters upon the hire of gas appliances as a district branch of business or as a remunerative line. No private individual or corporation, apart from the sellers of gas is anxious to embark in it. And that neither simple hire nor hire purchase carries any inducement to burn gas, beyond the fact that consumers are not likely to pay hire for an article that they do not want to use. In practice this is a sufficient protection so far as the ordinary consumer is concerned. Difficulties occasionally arise with the slots, because many people demand the cooker and three lights, or the full complement, when a boiling ring and one light are really all they intend to use regularly. And, therefore, it seems that when the gas company undertake a fixed outlay for the special service of any one customer, that customer on his part should undertake an equally definite adequate obligation to the company. The Perth system, and the simple hire system, meet this point. Other methods do not.

The Perth system conforms to another advantage, also in common with simple hire, and that is that the suppliers of gas get full con-

trol up to the burner, and it is their own fault if gas is prejudiced by extravagant or inefficient consumption. There was a time when the consumer was inclined to resist any attempt on the part of the company to assist or instruct him in the efficient or economical use of gas, as a sort of high handed interference with the liberty of the subject. It was considered sound and wise policy, in the interest of the customers, to stop the gas company at the outlet of the meter. This prejudice, which has had the effect of setting the clock back 20 to 25 years in many towns, has now been completely overcome, and the town office and showroom, situate in one of the leading business thoroughfares, is a well known place of resort to all the customers. That is a step in the right direction, but it does not go far enough. It is a good thing that the customer should know the way to the gas office, but very much better that the gas companies inspector should know the way to every burner on the customers' premises.

The destruction of household garbage such as tea leaves, potato peelings, cabbage stalks, odd scraps of meat, etc., is a question that arises not only in large institutions such as hospitals, schools, hotels, restaurants and such like, but in the better class of private house. Many ladies have assured me from time to time that they would use gas exclusively for cooking and hot water, but for the necessity of having a good fire in their kitchener to burn up the refuse daily. It is true that the public dust cart comes round once a week, but in hot weather the dust bin may become very offensive inside of 7 days, and they do not care for the annoyance incidental to the stopping of the dust cart in the road outside the front of the house, and carrying out and emptying the dust bin. Difficulties arise in another direction. The municipal engineer does not look with a favorable eye on the gas cooker, because it lowers the quality of his refuse. The dust and ashes from an ordinary coal grate contain a good deal of combustible matter that is valuable as a fuel in the municipal refuse destructor, and may be sufficient to insure complete complete combustion without the assistance of coal or other fuel. But where the gas cooker is used exclusively this combustible matter is absent, and the household refuse will not keep the destructor alive. In some towns it has been found that the coal bill is increased £1,000 a year or more. The municipal authorities do not recognize the fact that their loss is the public gain, as the ratepayers have paid for the ashes at the full price of good coal. The equivalent of £1,000 worth of coal as the destructor is quite £5,000 to the ratepayers, apart from the cost of collection and cartage.

Having these points in view, I was extremely interested when my attention was directed, a few days ago, to a household refuse destructor, fitted with a gas furnace, capable of destroying all the garbage from an ordinary household in half an hour. It is a small cylindrical stove something like a slow combustion greenhouse stove, that may be fixed in any odd corner of the scullery, or out of doors if preferred. People that object to stale garbage can consume everything once a day if they wish. And the municipal authorities will be saved the expense of collection and of providing an auxiliary fuel. In small towns where the inhabitants have to make their own arrangements for disposal of refuse the advantage is more pronounced, because the cost of destruction on the premises will not exceed that of carting it away. And in connection with large institutions there is a considerable saving. The chief point for us, however, is that the destructor not only destroys the household rubbish, but also a well-founded objection to the use of gas for cooking.

A statement has lately been made, on apparently good authority, that a high pressure gas lamp will not yield a duty exceeding 40 candles per cubic foot of gas consumed, and satorical reference has been made to the imaginative figure of 60 candles per cubic foot. As a rejoinder, Mr. Herbert Pooley, of Leicester, has published the results of authentic tests made upon high pressure lamps in his district, working at 7 inches mercury pressure, which go to show that a duty of 65 candles has been attained, and that the lamps are averaging a good 60. The photometrical value of the gas used is about 15 candles and the calorific value 516. So that, with an 18 candle gas of 600 B.T.U. or more, as supplied in many towns, a duty approaching 80 candles may be obtained.

More than once I have remarked on the backwardness of our Metropolis in the matter of street lighting—a matter for which, by the way, the gas companies are in no sense responsible, as the control of the public lighting is entirely in the hands of the local authorities. It is the same with a public body as with a private individual. If he or they choose to consume gas through a battered old iron fishtail burner the company cannot stop them. But this deficiency is fast being remedied, and within the last 10 years the gas lighting in the streets has been enormously improved. I think it would be easy to show that in London, results equal to those recorded at Leicester are an everyday, or it would be more correct to say, an every night experience. The latest improvement is the introduction of central suspended lamps, carried at a sufficient height to safely clear all the traffic, on a stout metallic cord extended from one building to the opposite side. By means of a simple mechanical arrangement, the lamp can be shifted to one side and lowered to the pavement, for examination or cleaning. And the gas supply is carried by a flexible metallic tube. This system has been tried in some of the leading thoroughfares, and is so generally approved that it will be rapidly extended. As there is nothing below the burner, there is an entire absence of shadow, and the roads and footways are left absolutely free from obstruction. A newspaper correspondent writes the public opinion in reference to the lighting of Fleet street in the following words: The new light is very effective, for no shadows are thrown * * * the mantles give a strong, steady light over the whole of the street.

New Methods and Appliances.

HISTORIC GAVEL FOR PRESIDENT, ILLUMINATING ENGINEERING SOCIETY.—At the opening session of the Illuminating Engineering Society (Hotel Schenley, Pittsburgh, Pa.) last Monday morning, Prof. Geo. A. Hoadley, of Swarthmore College, on behalf of the Philadelphia Section, presented to the Society a gavel that is a miniature ex-

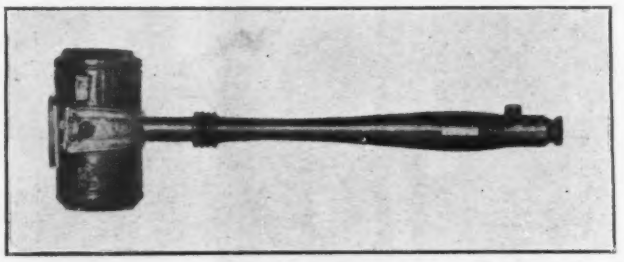


Fig. 1.

hibit of the development of artificial illumination in America. It is an exceedingly unique composition, and reflects much credit on those responsible for its construction. Beginning with the candle, and continuing through to the tube, vapor and magnetite arc lamps, all the various forms of illuminants are represented. The candle is

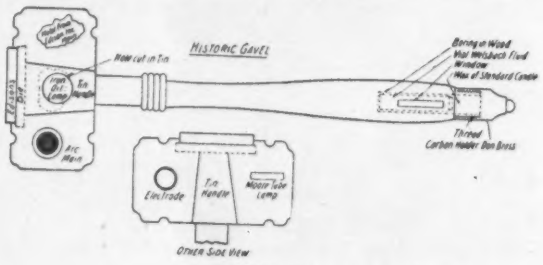
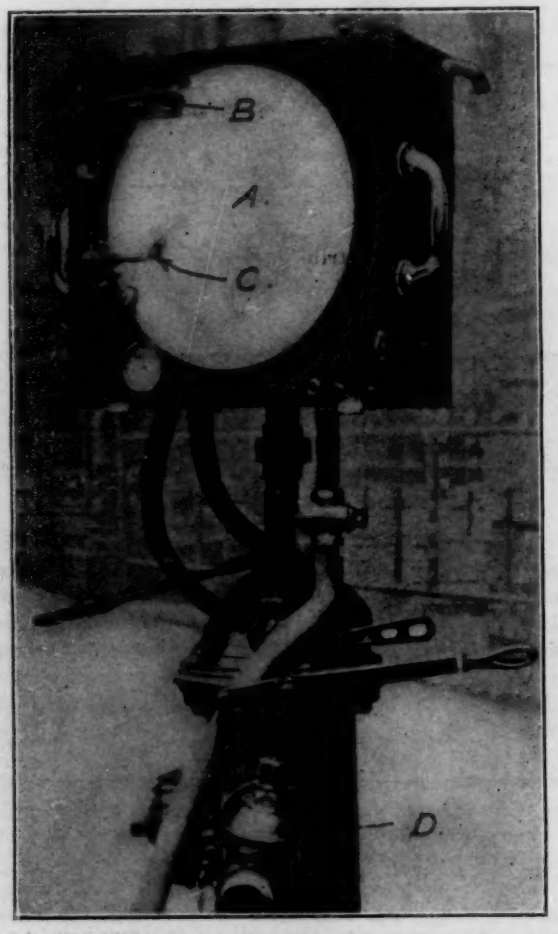


Fig. 2.

shown by the tin handle of a candle making apparatus from the residence of Prof. Geo. A. Hoadley, and presented by him. The oil lamp is represented by two pieces of iron from a bracket (the designs and makings of which were supervised by Benjamin Franklin) which was used to hold oil torches in Independence Square, Philadelphia, and were presented by Dr. Hollis Godfrey, Chief of Bureau of Gas, Philadelphia, Pa. The gas mantle enters by means of a vial of the original Welsbach lighting fluid, made in Dr. Auer's laboratory in 1887, and contributed by the Welsbach Company, Gloucester, N. J. The arc lamp is shown by an electrode used in the first magnetite arc lamp in 1903, contributed by Dr. C. P. Steinmetz; also a carbon holder, from the Thomson-Houston lamp, No. 9, contributed by Prof. Elihu Thomson. Arc lighting is represented by a piece of the single conductor cable, that was installed about 1880 by the municipality in Philadelphia for arc street illumination. This was contributed by Chief C. W. Pike, of the Electrical Bureau, city of Philadelphia. The part added for the incandescent lamp is a die, used by Dr. Thos. A. Edison in his experiments in making carbon filaments in 1879. This was the contribution of Mr. G. H. Stickney and Mr. J. W. Howell. The vacuum tube lamp enters the gavel through a section of the electrode of one of the Moore-Light Vacuum Tubes, used in the New York Electrical Show held in the Grand Central Palace, May, 1896, contributed by Mr. D. McFarlan Moore. A piece of the first Edison 3-wire cable installed in Philadelphia for electric lighting service (presented by the Philadelphia Electric Company), represents the lighting service. The gas industry is represented by a strip from the gasholder (85,000 cubic feet capacity) designed in England and erected in Baltimore for the first regularly incorporated gas company in America, the Gas Light Company, of Baltimore, established in 1816; this was contributed by Mr. George Beadenkopf.

LOCATING LEAKS IN WATER MAINS.—The Department of Water Supply of New York City is experimenting with a device, for locating hidden leaks, that utilizes the laws of transmission of water hammer in pipes. Mr. W. W. Brush, Deputy Chief Engineer, Department of Water Supply, Gas and Electricity, in a paper read at the convention of the New England Water Works Association, said of it: The pulsograph consists essentially of a large sensitive pressure recorder (*C*) having a rapid motion, a tuning fork (*B*) vibrating at the rate of 200 vibrations per sec., and a quick operating valve (*D*), which is on a blow-off or by-pass pipe. The instrument is set



The Pulsograph.—*A*, Recording dial; *B*, Time recording vibrator; *C*, Pressure recording arm; *D*, Quick operating valve to create water hammer.

up by screwing it to a hydrant nozzle, the hydrant being chosen so that there will be a straight run of several hundred feet before an open fourway branch is encountered. By closing valves on intermediate branches, the effect of a long, isolated line can be obtained.

In operation, the valve on the main below the hydrant is closed and water allowed to flow from the hydrant through the by-pass on the instrument. By quickly closing the by-pass valve a water hammer of about 15 pounds is created and recorded on the pressure gage. This pressure is maintained until water hammer pressure reaches the open branch at the end of the pipe line that is being tested, and the drop in pressure has travelled back to the hydrant; the tuning fork vibrations showing the time for this double travel.

By dividing twice the distance along the main to the open branch by the time, the rate of travel for the particular pipe is determined. This has been found to be approximately 3,600 feet per sec. for 6-inch pipe, and about 4,200 feet for 12-inch pipe.

If there is a leak in the main, or in a service near the main, the water hammer pressure is materially reduced by the leak, and the chart shows separately the reduction due both to the leak and to the open branch.

The distance to the leak can be determined by the time shown on the chart for the water hammer pressure to travel to the leak and return to the pulsograph, this being multiplied by the determined rate of travel of the hammer pressure along the pipe, and divided by two.

Several leaks have been located within limits of less than 20 feet by this instrument, and results from its further use will be interesting, as a decided saving in cost of locating leaks is anticipated.

Items of Interest
FROM VARIOUS LOCALITIES.

MR. F. S. FUGATE, formerly Illuminating Engineer with the Detroit City (Mich.) Gas Company, whose knowledge of theory and practice along the lines indicated is the result of years of experience, has been appointed Chief of the Illuminating Engineering staff of the General Gas Light Company, Kalamazoo, Mich. Both are to be congratulated; the Company on having signed-up the services of a practical man of the first class; Mr. Fugate on having attached himself to the staff of a Company noted for the correct commercial principles underlying all its dealings.

WRITING of Mr. Fugate recalls the pleasant fact that Mr. Humphry has completely recovered his health. Indeed, those who met the clever gentleman at the Michigan's Twenty-second, were forced to the conclusion that, from his spryness, coupled with his excellent staying powers, he had discovered some panacea towards which the Brown-Sequard elixir is as water is to wine.

MR. GUITTEAU, SR., for a third of a century chief aide to the late Mr. Charles R. Faben, of the old Toledo (O.) Gas Light and Coke Company, was present at the Michigan meeting. The grand veteran said that this was his first appearance at any gas association meeting since 1893, but he declared (although his business lines are altogether apart from the industry that he served so faithfully and well for a third of a century) that hereafter he would often answer roll call. Mr. Guitteau now represents as agent one of the prominent life assurance societies of the country, his district for such representation covering Northwestern Ohio. A friend, on meeting him in the presence of the writer, remarked: "Hello, Mr. Guitteau! How do you manage it? 'Tis 20 years since I saw you, and you look 10 years younger than you did then." The veteran replied: "Well, 'Frank,' it seems like this. I'm out of the gas business!"

THE only Thomas J. Moran, of the "A. B." Stove Company, Battle Creek, Mich., was the life of the automobile touring party that left the Pontchartrain the afternoon of the 18th. They had not travelled an eighth of a mile before the aforesaid irrepressible lad had the megaphone. The regular operator of the latter sat mute while "Mory." told the story of the scores of interesting points the party passed between the Pontchartrain and Grosse Point, and beyond. When it was over, and the megaphone was restored to its official custodian, the latter said to his substitute: "Thank you, Mr Moran; you have told me more about the 'points' of Detroit than I have known, or would ordinarily learn in 10 years' time!" "Good," said, T. J. M., "When you get back, petition your employers for better pay!"

ANOTHER veteran who was on hand, smiling, chipper and hearty, was Mr. W. H. Morgans, the former owner and manager of the Pontiac (Mich.) Light Company. Even if not actively in business Mr. Morgans has not lost interest in the art. He is again quite his former self physically.

THE Citizens Gas Company (Quincy, Mass.) shows receipts, for the twelvemonth ended June 30, 1913, amounting to $122,144. In 1912 the figures were $102,468; in 1911, $88,884.

MR. GEORGE M. HOWSMON, formerly New Business Manager with the New Orleans (La.) Gas Light Company, has been appointed to a responsible position in the Sales Division of the William M. Crane Company, New York City.

THE Adirondack Electric Power Corporation is making many improvements on its Shenandoah street gas plant, Oneida, N. Y. Next spring Superintendent Lorenzo Portin, who is now arranging plans for the work, will engage in the construction of an entirely new plant (likely of the coal gas type) for the named place.

SOME days ago the proprietors of the Kokomo (Ind.) Gas Company petitioned the Indiana Public Utilities Commission for the right to issue $15,000 in bonds, the proceeds from the sale of which are to be used for the extensions and betterments to its plant. The petition further avers that the Company, through competition with a natural gas supply, has been losing money; again, that the complete existing situation, in respect of the gas supply of Kokomo, will shortly be brought forward to the consideration of the Commission

On the 19th inst. Commissioner David P. Hodson, New York Public Service Commission (Second District) attempted to bring the representatives of the city of Buffalo, certain property owners on Crescent and Charlotte avenues and Colvin street, and the Buffalo Gas Company, together in respect of the prospective consumers of gas along certain sections of the named streets. The Company averred it could not make the extensions to supply gas in that it lacked funds to perform the work. For example, the cost in the Charlotte instance would be close to $5,000. Further, that the city was in debt to the Company in the sum of $200,000 for gas already furnished. After lengthy argument, in the course of which Commissioner Dodson attempted to induce the representatives of the Council to pay the Company a substantial sum on accout, pending the attempt of the Corporation Counsel to appeal from the decision of the Public Service Commission in respect of fixing the gas rate, the hearing was declared closed, and the petition and arguments were taken under advisement.

Manager De Freese, of the Chattanooga (Tenn.) Gas Company, has at last reaped 66 per cent. of the total for which his Company asked at the hands of the local Commissioners. His associates of the Company asked for a franchise extension amounting to 15 years; but the Commission decided that 10 years would be ample. Commissioner Sloan wished to have the period put at 5 years, but Commissioner Warner contended for 10 years, and his contention prevailed. Attorney Lancaster's work in the premises may be properly characterized as persistent and logical.

"B. V. R.," writing from La Grange, Ga., under date of the 18th inst., incloses this mention: "Of the $150,000 bond issue, voted in La Grange last October, the sum of $40,000 has been taken by J. N. Hazelhurst, of Atlanta, Ga., who with the proceeds therefrom will construct a gas plant to be operated on municipal account. The contract specifies that the plant shall be completed by February 1st, 1915. The buildings are to be of concrete, 9 miles of distributing pipe (none less than 3 inches in diameter) are to be laid, and the storage holder is to have a capacity of 50,000 cubic feet. Mr. Hazelhurst is ready to receive inquiries from gas apparatus manufacturers."

Press despatches, dated Tulsa, Okla., Sept. 18th, are to the effect that the 8th International Dry-Farming Congress and Exposition, will be opened the 22d prox., and will close November 1st. It is also declared that Tulsa will be lighted at night during the exhibition time "As no other city in the world has been lighted." The consumption of gas (natural) we are assured will not be less than 15 millions cubic feet each night; and this is to be consumed as it issues from a well, the casing of which is 4 to 6 inches. The pressure will be sufficient to drive the gas column to a height of 600 feet, before the point of flaming ignition is reached, and the flame will be visible for a distance of 500 miles. And is this spectacle worth the tremendous waste incurred? Will advertising Tulsa by means of an illumination that will show red clouds 500 miles away be of benefit to the denizens of the great cattle ranges, or to the aborigines who camp on its waterways and who roam its fields? Now, were we told that the Tulsaites had determined to build a holder up to retaining several millions cubic feet of this superb natural product, to be drawn upon as the needs of its manufacturers or the comfort of its residents demanded, then indeed would there be much to commend; but of this wilful misuse, of this extravagant abuse! Surely 'tis the cost of high living, not the high cost of living that Tulsa is anxious to proclaim.

Last week the workmen employed in digging out the earth for the excavation in which is to rest the huge gasholder to be constructed for the New England Gas and Coke Company, on Everett Creek, Everett, Mass., uncovered the remains of a great sunken forest. Huge trees, in petrified formation, were unearthed at a depth of 60 feet, and the numbers of the old forest monarchs brought to view were many. The find caused many to vist the place.

Mr. E. J. Brooks, for the last 18 months in charge of the desk of Advertising Manager of the Wm. M. Crane Company, 16-20 West 32d street, New York, has resigned, to take a responsible position on the advertising staff of the Larkin Company, Buffalo, N. Y. Originally Mr. Brooks was connected with the Messrs. John Wright & Company, of London, England, remaining with them 4½ years. When he determined to come to America he had reached the advertising and sales division of the Wrights. Arriving in America, he became connected with the advertising division of the New York house of John Wanamaker, and from there joined the Crane service. He is a clever chap, and we all wish him good luck in his new attachment.

Mr. J. A. Hancock has been appointed Superintendent of Distribution to the North Adams Gas Company, with supervision of the Company's districts in Adams and Williamstown, Mass. The appointee was formerly in like service with the Norwood (Mass.) Company. In fact, he was Superintendent of the latter.

At the 65th annual meeting of the Worcester (Mass.) Gas Light Company the officers elected were: Directors, Chas. D. Lamson, George Crompton, Thomas B. Eaton, Samuel B. Woodward, Francis H. Dewey and Col. George A. Bullard. President (his 25th succession), Chas. D. Lamson; Treasurer, De Witt Clinton; Clerk, De Witt Clinton. The reports showed the twelvemonth to have been the most prosperous year in the Company's history. The output for the year (864,965,900 cubic feet) was 10 per cent. over that for 1912; 12.6 miles of mains were added to the distributing system, bringing the total to 190.7 miles for the city—there are only 210 miles of streets in the city proper; the consumers numbered 27,526; and the gas street lights were returned at a shade under 1,000.

It is quite likely that the distributing system of the Lewes (Del.) Gas Company will be extended to the outlying pleasure or summer resort known as Rehoboth Beach. Messrs. Lofland, Baylis and Lank, of the Company, having asked the Rehoboth Commissioners for the necessary franchise.

Mr. Fred. M. Goodwin, Assistant Superintendent, Mains and Services Division, Boston Consolidated Gas Company, has been elected a member of the Board of Directors, representing thereon the employees' shareholders, such capital allotments having been gained through the operation of the Company's profit sharing plan. The appointee (he is 38 years of age) is a graduate of the Dorchester (Mass.) "High," and was, in his salad days, a clever kicker on the Tufts College eleven. He became connected with the Company in 1896, later on was on the staff of the Dorchester and Brookline Companies, and in 1905 returned to the ranks of the Consolidated. He is well-up in secret orders, and is well liked by the men whom he directs, and has the confidence of his employers.

"H. M. F.," writing from Revere, Mass., under date of the 23d inst., says: "The Local Employees' Association of the Suburban Gas and Electric Company, Revere, Mass., which is one of the links in the chain of Companies making up the Tenney service of Revere and Winthrop, held their first meeting for the coming season at the Club rooms, Monday evening, September 15th. The principal business for the evening was the election for officers, which resulted as follows: President and Manager, Mr. C. F. Chisholm; Vice-President, Mr. Thomas Dyffryn; Secretary, Mr. I. H. Sternberg; Treasurer, Mr. Charles F. Perry. Preceding the meeting, the regular 'home-cooked supper' was served to, and thoroughly enjoyed by the attending members, of whom there were many."

The Gas Machinery Company, of Cleveland, O., has been awarded the contract to reconstruct the gas works of the Oskaloosa (Ia.) Gas Light Company. The water gas plant is to be enlarged and improved by the placing of completely up-to-date machinery, and provision is also to be made for a coal gas plant.

"L. S. S.," writing from Wilmington, Del., under date of the 23d inst., says that, under the close supervision of Dr. Howard Bratton (executor of the estates of Dr. C. M. Ellis and Josephine Hinchliffe), the plant of the Elkton (Md.) Gas Company is being completely overhauled. In fact, when the new apparatus contracted for is all installed, the works will have been at least doubled in capacity and usefulness.

A peculiar feature of the proposed new charter for Houston, Tex., is contained in the following, designated as "Section 76 Power of the City to Buy Electricity, etc.": "The City of Houston shall have the power to buy gas, electricity, steam, water or any other kind of power, service or commodity needed for public use, and shall have the right to retail all such gas, electricity, steam or water power service or commodity which it may not need for its own use; provided, that no purchase or sale shall be made by the City Council, except upon and by authority of an ordinance, passed after it had been read at three regular meetings; provided, further, that before the city shall be bound by any contract sought to be made by the Council for the purchase or sale of any gas, electricity, steam or other power, commodity or service for a longer period of time than 5 years, the proposition therefor shall be submitted to a vote of the people of the city of Houston, which proposition shall consist of the ordinance proposed by the City Council and the material terms of the contract; and unless a majority of the votes cast at such election is in favor of the making of such contract the same shall not be made."

The Market FOR GAS SECURITIES.

Consolidated gas, despite fair trading in it, is ¼ off for the week. Nevertheless, the tone was good, and it may be the shorts in it will not like the next tune that the band will emit. City gas bonds are firmer, and the demand is quite brisk.

In out-of-town shares, Peoples, of Chicago, afforded excitement, in that it actually broke all records as to quotations. It sold up to 130; and, little wonder, for this official news respecting it came out to-day, Friday. Mr. Samuel Insull, the moving genius of the Commonwealth Edison, Jas. A. Patten and Jno. J. Mitchell, of the Illinois Trust & Savings Bank, have been elected to the Directorate. And the first named was chosen Chairman of the Board. Mr. George O. Knapp was succeeded in the Presidency by that cleverest of Western diplomats, Mr. James F. Meagher—he had been Vice-President. If that is not a smooth bench, we are mistaken.

The Roanoke (Va.) Gas Light Company will pay a quarterly of 1½ on the preferred, October 1st; the Continental Gas and Electric pays 1½ on the preferred and ½ of 1 on the common, both to be distributed Wednesday next.

Worcester (Mass.) is 295, bid; Springfield (Mass.) is 285, bid; Lowell (Mass.) is 295, bid—the local electric corporation is just 100 points lower; and Fall River gas is 295, bid—Fall River Electric being 195. Pretty good indications of how gas shares are regarded in the Bay State.

Gas Stocks.

Quotations by George W. Close, Broker and Dealer in Gas Stocks.

115 BROADWAY, NEW YORK CITY.

SEPTEMBER 29.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par alue of $100 per share:

N. Y. City Companies.	*Capital.*	*Par.*	*Bid.*	*Asked*
Consolidated Gas Co.	$99,816,500	100	132¾	133
Central Union Gas Co.—				
1st 5's, due 1927, J. & J.	8,500,000	1,000	101	103
Equitable Gas Light Co.—				
Con. 5's, due 1932, M. & S.	1,000,000	1,000	105	106
Mutual Gas Co.	2,500,000	100	157	157
New Amsterdam Gas Co.—				
1st Con. 5's, due 1948, J. & J.	11,000,000	1,000	99	101
New York & Richmond Gas				
Co. (Staten Island)	1,500,000	100	59	63
1st Mtg. Gold Bds. 5 p. ct.	1,500,000	—	98½	100½
New York and East River—				
1st 5's, due 1944, J. & J.	2,500,000	1,000	103	105
Con. 5's, due 1945, J. & J.	1,500,000	—	98	100
Northern Union—				
1st 5's, due 1927, J. & J.	1,250,000	1,000	100	102
Standard	5,000,000	100	102	104
Preferred	5,000,000	100	93	94
1st Mtg. 5's, due 1930, M. & N.	1,500,000	1,000	93	95
The Brooklyn Union	15,000,000	1,000	127½	129
1st Con. 5's, due 1948, M. & N.	15,000,000	—	106¾	107
Yonkers	299,550	500	130	—
Out-of-Town Companies.				
Binghampton Gas Works	450,000	100	—	—
" 1st Mtg. 5's	509,000	1,000	97	100
Boston United Gas Co.—				
1st Series S. F. Trust	7,000,000	1,000	82	85
2d " " "	3,000,000	1,000	47½	50
Buffalo City Gas Co.	5,500,000	100	5	8
Bonds, 5's	5,250,000	1,000	59	60
Chicago Gas Co. Guaranteed				
Gold Bonds	7,660,000	1,000	104	105¼
Cincinnati Gas and Electric				
Co.	29,500,000	100	69	70
Columbus (O.) Gas Co., 1st				
Mortgage Bonds	1,500,000	1,000	96	98
Columbus Gas Light & Fuel				
Company	1,682,750	100	65¾	66¼
Preferred	3,026,500	100	33	35¾
Essex and Hudson Gas Co.	6,500,000	—	133	136
Fort Wayne	2,000,000	—	—	—
" Bonds	2,000,000	—	55	—
Grand Rapids Gas Light Co.,				
1st Mtg. 5's	1,850,000	1,000	100	101
Hartford	750,000	25	190	200
Hudson County Gas Co., of				
New Jersey	10,500,000	—	130	132
" Bonds, 5's	10,500,000	—	104	106
Indianapolis	2,000,000	—	85	90
" Bonds, 5's	2,650,000	—	90	93
Jackson Gas Co.	250,000	50	82	—
" 1st Mtg. 5's	290,000	1,000	97	100
Kansas City Gas Light Co.,				
of Missouri	5,000,000	100	—	86
Bonds, 1st 5's	3,822,000	1,000	98½	99
Laclede Gas Co., St. Louis.	10,000,000	100	100	101¼
Preferred	2,500,000	100	—	102½
Bonds	10,000,000	1,000	102½	103
Lafayette Gas Co., Ind.	1,000,000	100	—	60
Bonds	1,000,000	1,000	60	65
Louisville	2,370,000	50	120	130
Madison Gas and Electric Co.				
" 1st Mtg. 6's	400,000	1,000	106	
Massachusetts Gas Companies, of Boston	25,000,000	100	92½	93
Preferred	25,000,000	100	91½	92¼
Montreal L. H.& P., Canada	2,000,000	100	218	219
Nashville Gas Light Co.	1,000,000	100	110	—
Newark, N. J., Con. Gas Co.	6,000,000	—	97	98
Bonds, 6's	6,000,000	—	127	128
New Haven Gas Co.	5,000,000	25	182	190
Peoples Gas Lt. & Coke Co.,				
Chicago	25,000,000	100	128	128¼
1st Mortgage	20,100,000	1,000	102	102½
2d "	2,500,000	1,000	104	—
Rochester Gas & Electric Co.	2,150,000	50	88	—
Preferred	2,150,000	50	118	—
Consolidated 5's	2,000,000	—	104¾	105¼
Pacific Gas and Electric Co.	15,500,000	—	38	40
St. Joseph Gas Co.—				
1st Mtg. 5's	1,000,000	1,000	93	93
St. Paul Gas Light Co.	2,500,000	100	—	—
1st Mortgages, 6's	650,000	1,000	104	106
Extension, 6's	600,000	1,000	112½	115
General Mortgage, 5's	3,447,000	1,000	94	96
Syracuse Gas Co., N. Y	1,976,000	100	50	55
Bonds	2,047,000	1,000	101	103
United Gas Imp. Co.	55,502,950	50	87	87¼
Washington (D. C.) Gas Co.	1,600,000	200	425½	427½
1st Mortgage, 6's	600,000	—	—	—
Western Gas Co., Milwaukee	4,000,000	—	—	—
Wilmington (Del.) Gas Co.	600,000	50	—	—

MEETING TIMES OF THE VARIOUS GAS ASSOCIATIONS.

American Gas Institute.—Annual meeting, Richmond, Va., October 15-17, 1913. Officers: President, W. R. Addicks, New York City. Secretary, Geo. G. Ramsdell, 29 West 39th st., N. Y. City.

Canadian Gas Association.—Annual meeting———1914. Officers: President, A. A. Dion, Ottawa; Secretary and Treasurer, John Keillor, Hamilton, Ont.

Empire State Gas and Electric Association.—Annual meeting, New York City, Oct. 8, 1913. Officers: President, C. G. M. Thomas, Long Island City, N. Y.; Secretary, C. H. B. Chapin, 29 W. 39th street, New York City.

Gas Meters.—Monthly Section Meetings; Grand Commissioner, Will. W. Barnes, East Orange, N. J.; Gen'l Sec'y, H. Thurston Owens, La Crosse, Wis.; New York Section, Chairman, W. H. Pettes; Secretary, G. E. Smith, Sipp Avenue, Jersey City, N. J. Philadelphia Section; Chairman, Stanley Grady; Secretary, H. E. Stiteler, Broad and Arch streets. Cleveland Section, Chairman, F. R. Hutchinson; Secretary, Wm. Holtz, East Ohio Gas Co. New England Section, Chairman, T. W. Jennings, Boston; Sec., F. K. Wells, 60 Broad street, Boston. Winona Section, Winona, Minn., W. F. Clausen, Chairman. Bethlehem Section, Trueman Weithnecht, Chairman; Sec.-Treas., Truman Buss, South Bethlehem, Pa.

Guild of Gas Managers of New England.—Annual meeting, March, 1914. Young's Hotel, Boston; monthly meeting, second Saturday. Officers: President, Walter G. Africa, Manchester, N. H.; Secretary, H. K. Morrison, Brockton, Mass.

Illinois Gas Association.—Annual meeting, March 18th and 19th, 1914. Chicago, Ills. Officers: President, W. F. Barrett, Chicago, Ills.; Secretary-Treasurer, Horace H. Clark, 115 No. Oak Park avenue, Oak Park, Ills.

Illuminating Engineering Society.—Annual meeting,——— September, 1913. Meetings of Sections, monthly. Pres., Preston S. Millar; General Secretary, J. D. Israel, 29 W. 39th street, New York City. Sections: New York, Secretary, C. L. Law, 124 West 42d street. New England, Secretary, H. C. Jones, 10 High street, Boston, Mass. Philadelphia, Secretary, L. B. Eichengreen, Broad and Arch streets. Chicago, Secretary, J. B. Jackson, 28 North Market street. Pittsburgh, Secretary, J. C. Mundo, Oliver Building.

Indiana Gas Association.—Annual meeting, March —— —— 1914. Terre Haute. Officers: President, A. S. Cooke, Terre Haute; Vice-President, A. C. Blinn, Evansville; Secretary-Treasurer, Philmer Eves, Indianapolis.

Iowa District Gas Association.—Annual meeting, Davenport, May 27, 28, 29, 1914; Officers: President, B. C. Adams, Lincoln, Neb.; Secretary, G. I. Vincent, Des Moines, Ia.

Kansas Gas, Water and Electric Light Association.—Annual meeting, October—— 1913. ——— Officers: President, L. O. Ripley, Emporia, Kas.; Secretary and Treasurer, W. H. Fellows, Leavenworth, Kas.

Michigan Gas Association—Annual meeting, September, 1914. Place, undetermined. Officers: President, H. W. Douglas, Ann Arbor, Mich; Secretary-Treasurer, Glenn R. Chamberlain, Grand Rapids, Mich.

Missouri Electric Light, Gas, Water Works and Street Railway Association.—Annual meeting, April, 1914; Mexico, Mo. Officers: President, P. A. Bertrand, Joplin, Mo.; Secretary and Treasurer, P. W. Markham, Brookfield, Mo.

National Commercial Gas Association.—Annual meeting and gas show, Dec. 1-6, 1913. Philadelphia, Pa. Officers: President, C. W. Hare, Philadelphia Pa.; Secretary, Louis Stotz, 29 West 39th street, New York City.

Natural Gas Association.—Annual meeting, St. Louis, Mo., May 19 and 20, 1914; Officers: President, E. L. Brundrett, Kansas City, Mo; Secy-Treas., T. Clive Jones, Delaware, O.

New England Gas Association.—Annual meeting, February, 18th and 19th, 1914, Boston. Officers: President, T. H. Hintze, Providence, R. I.; Secretary-Treasurer, N. W. Gifford, East Boston, Mass.

New Jersey State Gas Association.—Annual Meeting, July —, 1913, Asbury Park N.J. President, C. F. Butcher, Freehold, N. J.; Sec'y-Treasurer, O. F. Potter, Newark, N. J.

Ohio Gas Association.—Annual meeting, February ——— 1914 Columbus, O.; President, John M. Garard, Columbus, O.; Secretary, L. B. Denning, Columbus, O.

Oklahoma Gas, Electric and Railway Association.—Annual meeting, Oklahoma City May, ——1914. President, F. E. Bowman, Ada; Secretary-Treasurer, H. V. Boze Oklahoma City.

Pacific Coast Gas Association.—Annual meeting, Long Beach, Cal., September ——— 1914. Officers: President, C. S Vance, Los Angeles, Cal.; Secretary-Treasurer, Henry B stwick, 445 Sutter street, San Francisco, Cal.

Pennsylvania Gas Association.—Annual meeting, Allentown, Pa., April ———, 1914; Officers, President, J. A. Frick, Allentown, Pa.; secretary-Treasurer, W. O. Lamson, Jr., West Chester, Pa.

Society of Gas Lighting.—Annual meeting Dec., 11, 1913; monthly meetings, second Thursday. Place, New York City. Officers: President, Fred. S. Benson; Secretary, George G. Ramsdell, 29 West 39th street, New York city.

Southern Gas Association.—Annual meeting, Mobile, Ala., April 4, 1914. Officers: President, James Ferrier, Rome, Ga.; Secretary-Treasurer, E. D. Brewer, Atlanta, Ga.

Southwestern Electrical and Gas Association.—Annual meeting, May——— 1914, Galveston, Tex. Officers: President, G. H. Gifford, Fort Worth Tex.; Secretary H. S. Cooper, 405 Slaughter Bldg., Dallas, Tex.

Wisconsin Gas Association.—Annual meeting, May ———1914, Milwaukee, Wis. Officers: President, Ewald Hasse, Milwaukee, Wis.; Secretary-Treasurer, Henry Harman, Milwaukee, Wis.